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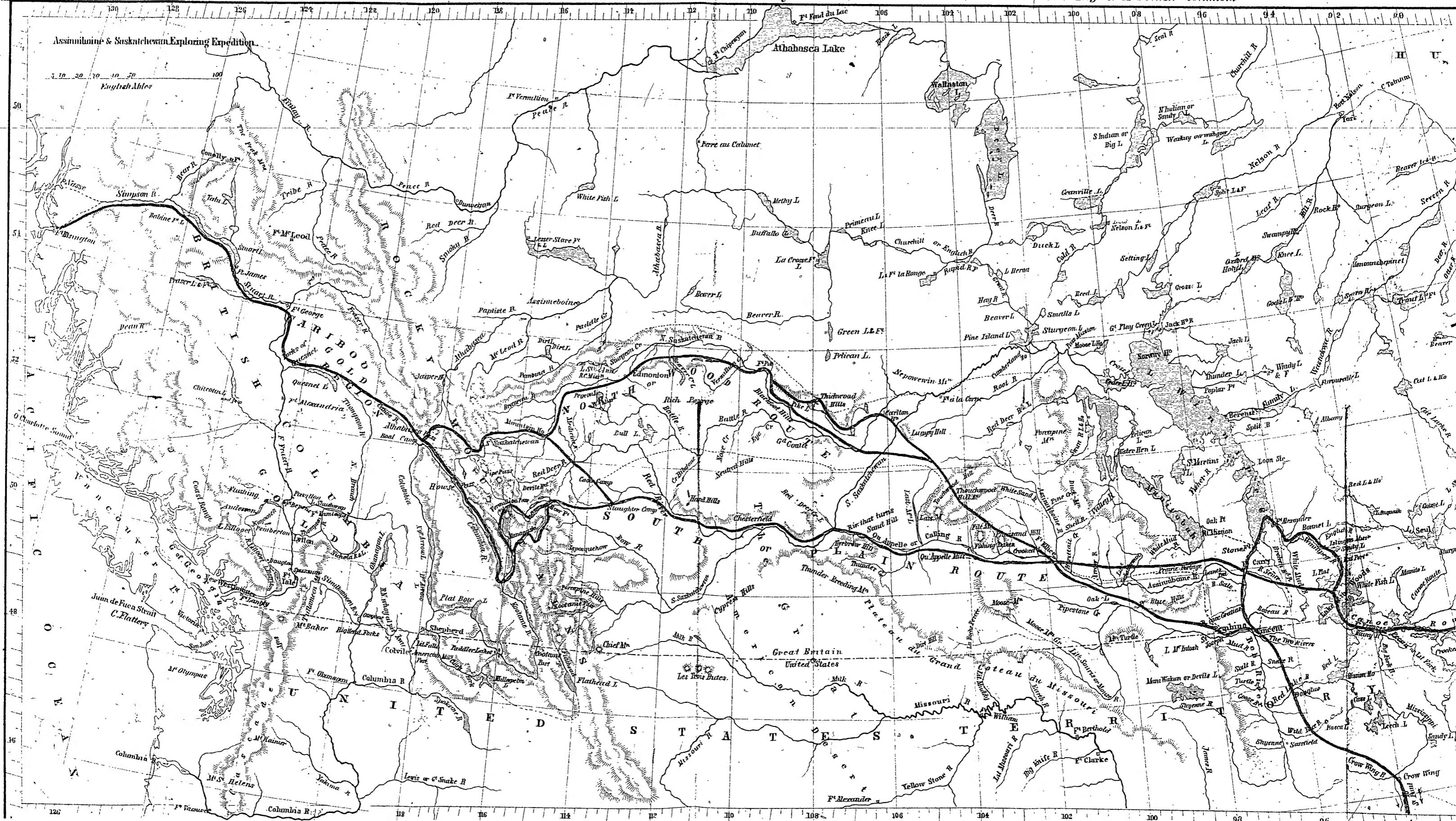
Mr. Goldsworthy



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Map of the Country from LAKE SUPERIOR to the PACIFIC OCEAN

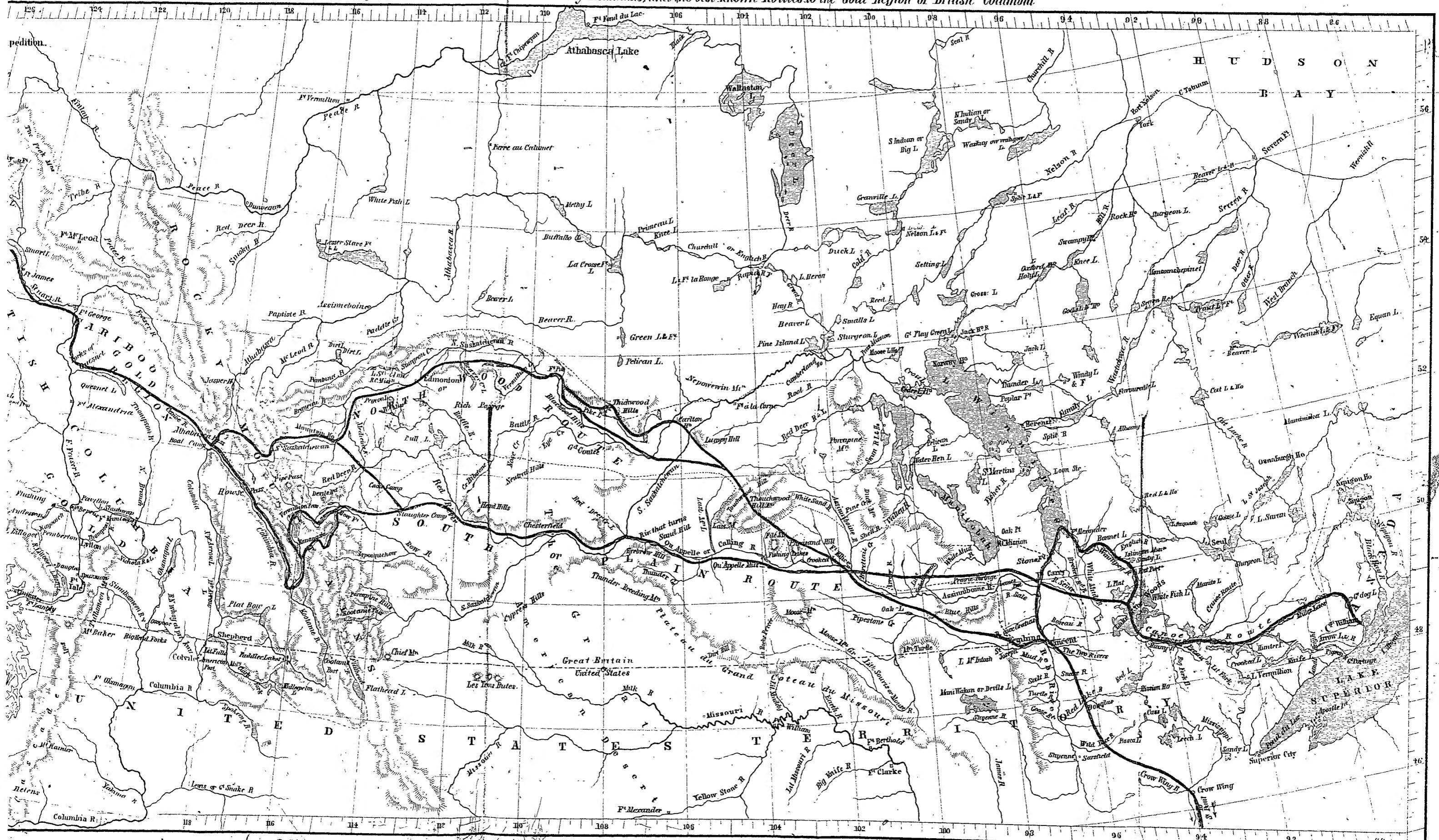
showing the Fertile Belt stretching from the Lake of the Woods to the Rocky Mountains, and the best known Routes to the Gold Region of British Columbia.

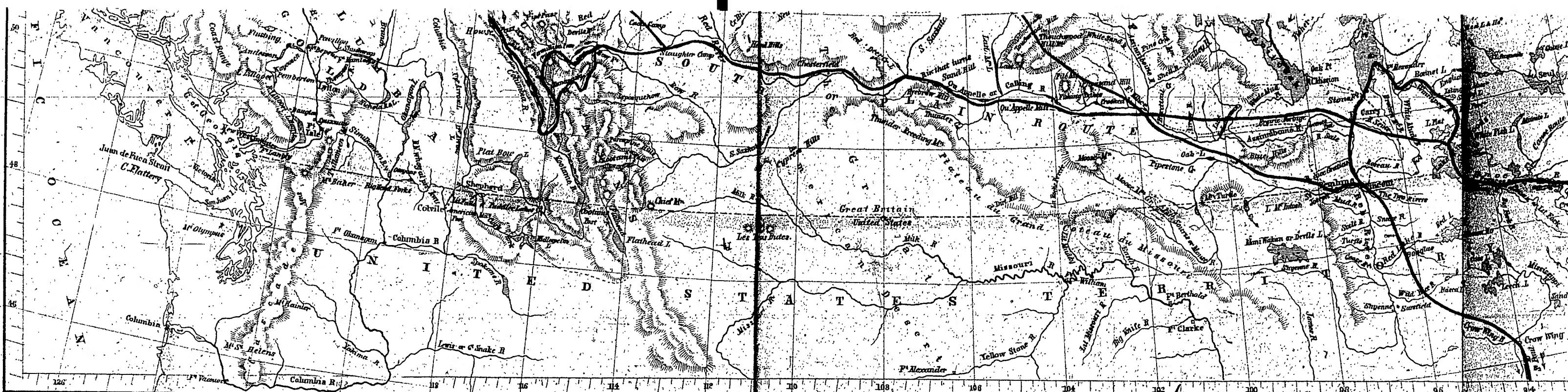


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Map of the Country from LAKE SUPERIOR to the PACIFIC OCEAN

showing the Fertile Belt stretching from the Lake of the Woods to the Rocky Mountains, and the best known Routes to the Gold Region of British Columbia.

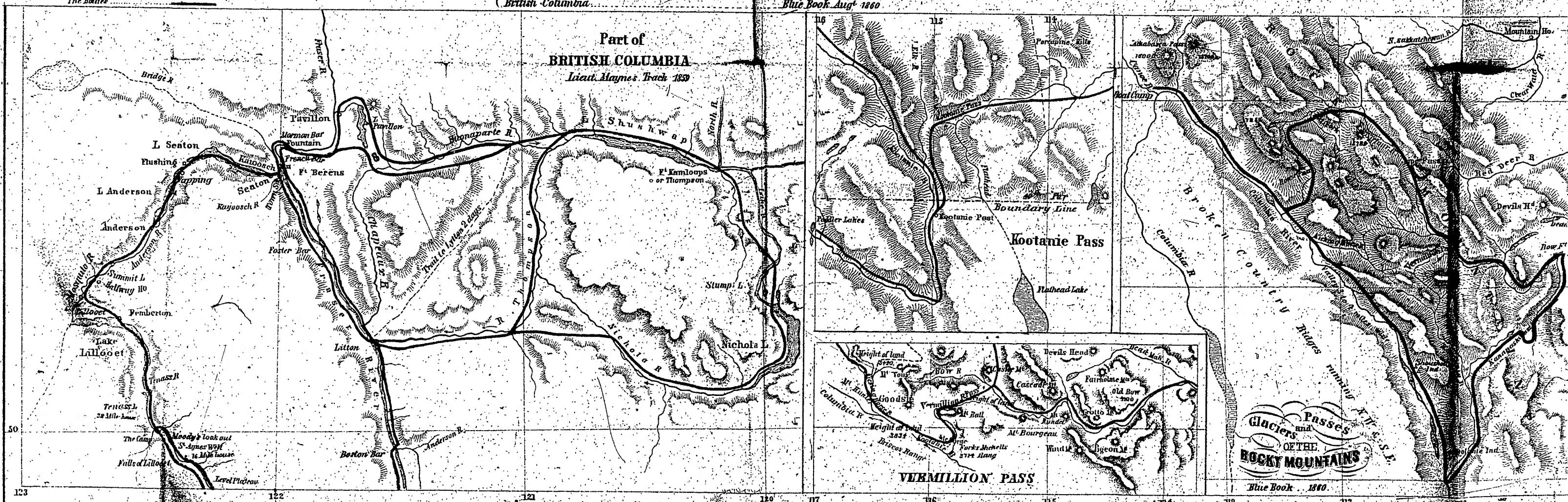




The Fertile Belt is colored
The Glaciers
The Routes

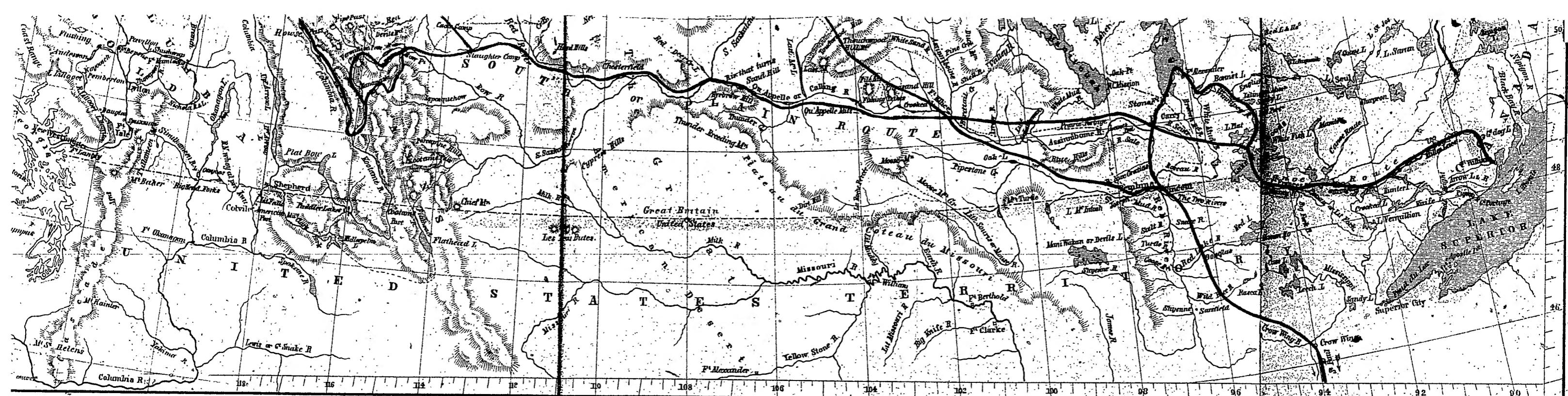
Authorities
From Lake of the Woods to Parks at the Saskatchewan
From Forks of the Saskatchewan to the Rocky Mountains
British Columbia

The Assiniboine & Saskatchewan Expedition
Capt. Palliser's Expedition
Blue Book Augt 1860



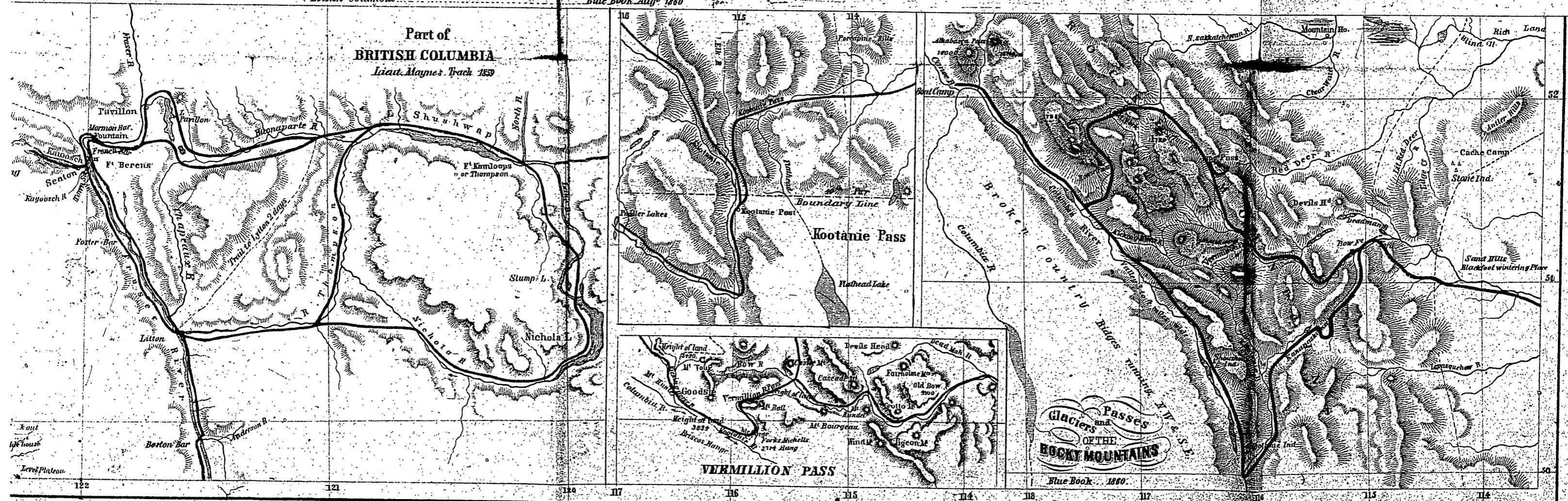
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Authorities { *From Lake of the Woods to Forks of the Saskatchewan.*
From Forks of the Saskatchewan to the Rocky Mountains.
British Columbia.

*The Assiniboine & Saskatchewan Expedition
Capt. Palliser's Expedition
Blue Book. Aus't 1860.*



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A SKETCH

OF AN

OVERLAND ROUTE

TO

BRITISH COLUMBIA,

BY

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COLLEGE, TORONTO;

AUTHOR OF

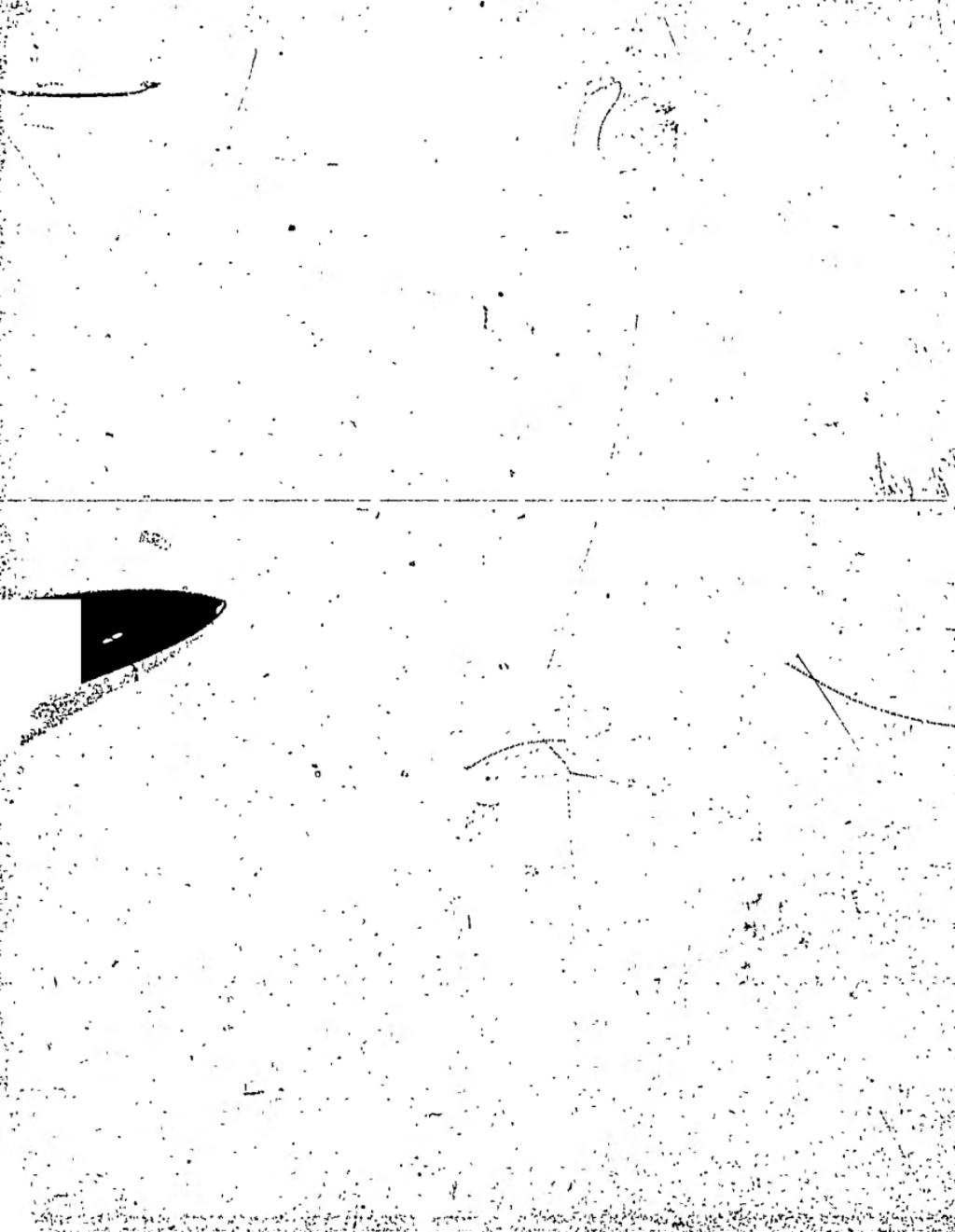
NARRATIVE OF THE CANADIAN EXPLORING EXPEDITION
OF 1857, AND OF THE ASSINIBOINE AND SASKATCHEWAN
EXPLORING EXPEDITION OF 1858.

TORONTO:

W. C. CHEWETT & CO., PRINTERS,
KING STREET EAST.

1862.

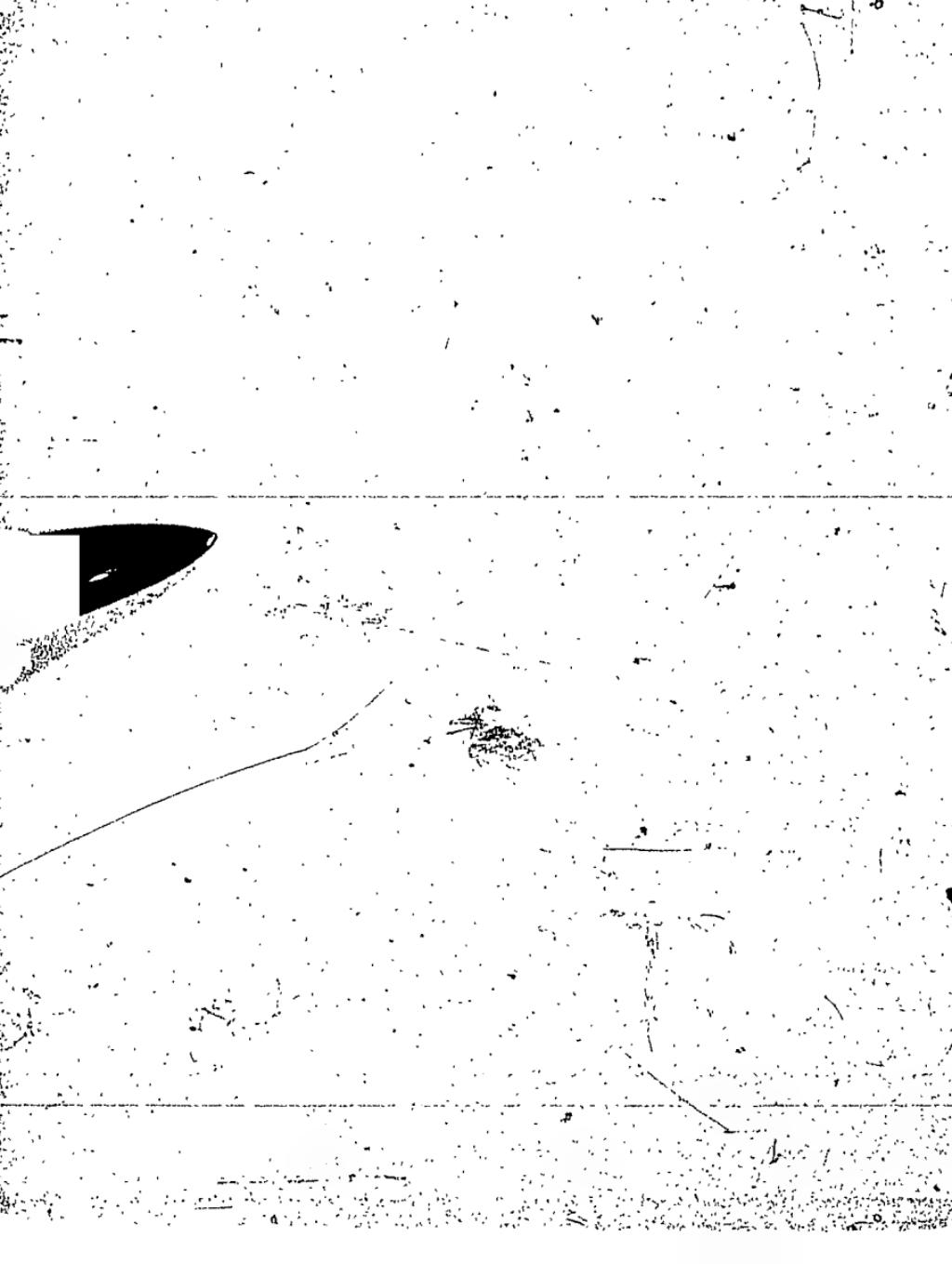




ERRATUM.

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"It is not unreasonable to look forward to the establishment of a regular system of transit, commencing from Nova Scotia and the shores of New Brunswick, passing through Canada, touching upon the Red River Settlement crossing the Prairies to the **VERMILLION PASS**, where we know that the inclination is so moderate that nature has placed no insurmountable obstacles to the construction of a railway, till it reaches the gold-bearing Colony of British Columbia, creating fresh centres of civilization, and consolidating British interest and feelings." *EARL OF CARNARVON at the Presentation of the Royal awards to Captain R. F. Burton and Captain John Palliser—Royal Geographical Society, May 28, 1859,*



INTRODUCTION.

A MERE sketch like the present requires no prefatory remarks. It is sufficient to say, that my own personal knowledge of the country extends to the Elbow of the South Branch of the Saskatchewan; for the description of the country west of that point I am indebted to British Parliamentary papers, and to several papers by Dr. James Hector, published in the proceedings of different learned Societies in England and Scotland. The large map was originally prepared by Arrowsmith for my Report of the Assiniboine and Saskatchewan Expedition, published by command, London, Aug., 1860. The smaller maps are from British Parliamentary papers. One word to the reader about the North-west Territory. Glance at the map and you will see a broad, yellow-coloured Fertile Belt, stretching from the Lake of the Woods to the auriferous flanks of the Rocky Mountains. That beautiful oasis is bounded on the north by a sub-arctic, forest covered region, on the south by an arid and uninhabitable desert, stretching to the Red River of the south and the high plains of Texas. That belt contains **FOURTY MILLION** acres of the richest soil. On the western limits of the Fertile Belt lies the great gold country. Cross the low height of land, not 5,000 feet above the sea, through the Vermillion Pass, and you tread upon the auriferous terraces of British Columbia. Cariboo and Kootanie are both just on the other side of the mountains, or between four and five hundred miles from the Pacific coast. The whole valley of the Upper Columbia is auriferous; the entire western flank of

the mountains is a region rich in gold. It is as it were a step from the Fertile Belt, drained by the North Saskatchewan, to one of the richest gold-fields in the world, in the midst of grand mountains, towering precipices, and foaming rivers, but with little pasture land, or land fit for tillage. Is there not in this a providential disposition? Does not that Fertile Belt point out the true path across the continent? The way by which, first British Columbia, then China, then India, may be reached from Europe. The way by which British civilization, laws and liberty are to be carried to the Pacific, and thence to Asia, through BRITISH AMERICA.

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OVERLAND ROUTE

TO

BRITISH COLUMBIA.

An emigrant or tourist, starting from any part of the valley of the St. Lawrence, and desirous of crossing the continent by the most direct road to British Columbia, has two lines of route to choose from, involving very different means of communication. He may make the greater part of the long journey in canoe or freighter's boat, or he may adopt the less monotonous and perhaps more agreeable mode of travelling, by traversing the prairies and mountains on horseback or on foot. In case he choose the water communication, his point of departure will be Fort William, on Lake Superior, and the voyage will be made altogether through British territory. If he should prefer the prairies, he will start from St. Paul or St. Cloud, in Minnesota, or from Fort Garry, at Selkirk or Red River Settlement, which he may reach by the canoe route from Fort William, or the land route from St. Cloud. These means of communication differ so widely from one another, that

I shall describe the details of each under the separate headings of "THE PRAIRIE ROUTE," and "THE CANOE ROUTE."

THE PRAIRIE ROUTE.

I will assume that a party of twenty have made arrangements to travel in company, and share all the difficulties and dangers of the Prairie Route.

The best mode of proceeding would be, to meet at St. Paul, or St. Cloud, in the State of Minnesota, during the last week in April, in time for the first trip of the steamer from Georgetown to Pembina and Fort Garry. The reason why it is not advisable to make an earlier start, will be at once apparent when it is known that the Red River of the North does not become clear of ice before the middle of April, and in some years it is much later. In 1859, Capt. Blakiston crossed Red River on the ice, with horses, near the 49th parallel, on the 1st day of May.

If the party intend to proceed from St. Paul or St. Cloud with horses and carts, it would not be advisable to start before the second week in May, as there would be no young grass on the prairies for the cattle; and the rivers would all be full, and much of the country flooded, in consequence of the melting snows. When the Red River half-breeds make their annual journey from Fort Garry to Crow-wing and St. Paul, they usually start from the settlements between the 1st and 10th of June, which is the earliest period when they can rely on fresh pasture for their horses and oxen.

If the party should determine to take the chance of procuring horses at Pembina, St. Joseph, or the Red River Settlement, it would be desirable to make enquiries as to the time when the steamers will be likely to leave Georgetown, on their first trip down the river. The journey can be made from Canada by rail to Milwaukee; thence to Prairie du Chien, or any other point on the Mississippi; thence by steamer to St. Paul. From that place to Georgetown, on Red River, about 290 miles, Burbank's stages form a regular line of communication; and from Georgetown steamers will convey the party to Pembina or Fort Garry. If the connections are properly made, the distance between Toronto and Fort Garry can be accomplished in twelve or thirteen days. It is doubtful, however, whether several parties would succeed in procuring fifteen or twenty horses each in the settlements without considerable loss of time, and paying an exorbitant price for them. The Hudson Bay Company were so short of horses in 1858, that they allowed Capt. Palliser £20 sterling each for twenty-five horses. I was compelled to pay the Company, at Fort Garry, £50 sterling for two good horses, in June of the same year, and only procured them through the intervention of Sir George Simpson. Pembina and St. Vincent are very small and scattered villages, without any resources whatever. St. Joseph, thirty miles west of Pembina, contains about five hundred souls; and horses may be obtained there. But, if several parties of twenty each, propose to follow the Prairie Route on horseback, there will be great difficulty in procuring horses at or near Fort Garry, or at St. Joseph. Both horses and mules can be obtained at St. Paul, or in the towns

between St. Paul and Crow-wing. It will be a matter for careful consideration whether it would not be advisable to make sure of this important part of the outfit before leaving the settlements on the Upper Mississippi.

I will assume, in the first instance, that the members of a party, consisting of twenty persons, determine to procure their outfit at St. Paul, or between it and St. Cloud, and make that town the starting point of their journey. They will require at least five carts, constructed after the fashion of those in common use in Lower Canada or at Red River, with broad strong wheels, and with as little iron work about them as possible. The Red River carts have no iron work, not even a screw, nail, or tire; and they are quite strong enough, when well made, to go to the Rocky Mountains and back again, with one or two changes of the axle, which is the only part liable to wear away under ordinary circumstances. Waggons, constructed after the model common in the States and Canada, are to be avoided, without they are provided with a very good and strong team. There is always difficulty in getting a waggon through the swamps and bogs. I had an American waggon with me in 1858, intending to take it as far as the Elbow of the South Branch of the Saskatchewan, but I was glad to leave it at Fort Ellice until my return. There is no doubt, however, that a covered waggon with high and broad wheels, made as light as is consistent with safety, and with very little iron work about it, is a comfortable, convenient, and valuable adjunct to a journey across the Prairies; and if constructed in the manner described, and drawn by a yoke of well-trained oxen, or a pair of good horses or mules, it is to be recommended.

Mules are very valuable, if good animals can be obtained; they are extremely hardy, very sure-footed, keep fat on indifferent pasture, and generally have great endurance. Oxen are slow and sure, but must always be watched or tethered at night, for the first three or four weeks, or else they will wander, and endeavor to retrace their steps homeward. Instances have frequently been known in the praries of oxen starting off in a direct line for their homes, and making 25 and 30 miles before they were caught. I lost an ox for some hours on the Assiniboine, when 200 miles from Red River; he wandered homeward in the night-time, and was overtaken about 10 miles from the camp, leisurely retracing his steps to the settlements. Oxen have the advantage over horses in being able to draw a heavier load. The usual load for a long journey is from 400 to 600 lbs. for horses, and from 700 to 900 lbs. for oxen. The usual distance travelled during the day is from 20 to 25 miles. When the roads are good, the weather favorable, and the loads not too heavy, oxen will accomplish twenty-five miles a day for a month together (Sundays excepted), without difficulty, and not lose condition. There are few Red River horses that will do this without losing flesh.

The provisions absolutely necessary for the journey to a party wholly unaccustomed to the praries or to hunting, are at least three quarters of a pound of flour or oatmeal, and half a pound of bacon per diem, and tea at the rate of one pound per month. This is the minimum that should be taken. It is assumed that most of the party will be provided with a single or double-barrelled gun, and there will be no difficulty in procuring prarie hens and ducks on the trail after leaving the settle-

ments, as far as Pembina. After leaving Pembina prairie hens will be scarce, but along the whole line of route enough ducks and geese may be procured to supply a considerable proportion of the provisions required. When near the south branch of the Saskatchewan, buffalo will probably be met with, and a supply of dried meat may be laid up in store. The journey, including stoppages, will probably require from ten weeks to three months; consequently, the minimum amount of provisions it would be safe to rely upon, would be 60 lbs. of flour, and 40 lbs. of bacon or pork, or dried beef, for each man. If pemican or dried buffalo meat can be procured at the settlements or at St. Joseph,—which is doubtful—no better provision can be had; but it would not be wise to rely upon obtaining a supply of pemican or dried meat in the spring of the year. Captain Blakiston, one of the members of the Palliser Expedition, lived during the whole summer of 1858 on dried buffalo meat, and such other casual supplies of venison and mountain trout as he was able to procure. He had neither bread, salt nor sugar, and did not feel the want of these apparent necessaries of life. Tents are not necessary, but oil-cloths are indispensable, not only for protecting the supplies during rain, but also for laying on the ground at night, and making a temporary tent under the carts, or with three poles. Each cart should be provided with two oil-cloths; they are always useful, and sometimes most valuable, as in crossing rivers, during thunder-storms and prolonged rains, &c. Each member of the party should be provided with at least one complete change of good strong clothing, with an additional supply of flannel shirts, worsted stockings and flannel drawers. An india-rubber or gutta-

percha cloth is very valuable in crossing rivers. The mode of effecting this operation will be described further on. At the close of these pages, a list of indispensable and merely useful articles are given, so that any further enumeration is at present unnecessary.

If the party are fully equipped at St. Paul, the route may lie by the mail and stage road to Georgetown, thence by the prairie road on the east bank of Red River, to Pembina. It is not advisable to travel on the west bank, in consequence of wandering parties of Sioux Indians, who are always ready to seize any opportunity of stealing horses, and sometimes venture to "lift a scalp." The distance between St. Paul and Georgetown is as follows:

FROM ST. PAUL TO ST. CLOUD, 74 MILES.

	MILES.	TOTAL.
St. Joseph	7	7
Cold Spring	10	17
Richmond	4	21
Oak Grove	19	41
Sauk Centre	17	58
Kandotta	2	60
Osakis	10	70
Alexandria	18	82
Evansville	22	104
Dayton (Wascata P. O.)	27	131
Breckenridge	24	155
Graham's Point	12	167
Burlington	26	193
Shayenne	20	213
Georgetown	4	217
Total from St. Paul to Georgetown	291	

But if it is desirable to take the most direct route to Pembina, the road will pass through Crow-wing, and Otter Tail

River. This is the route I followed in 1857, when returning from Fort Garry to Crow-wing. The road is good and safe, and there is a ferry at Red Lake River. The following are the distances:

ST. PAUL TO PEMBINA.

United States Military Road-Surveys, 1857.

FROM ST. PAUL TO

	MILES.	TOTAL
St. Anthony (opposite the Falls).....	9	9
Manomin.....	7 $\frac{1}{2}$	16 $\frac{1}{2}$
Anoka (east of Rum river).....	10	26 $\frac{1}{2}$
Itasca.....	6 $\frac{1}{2}$	33
Orono (Elk river).....	7	40
Humboldt (Big Lake).....	8 $\frac{1}{2}$	48 $\frac{1}{2}$
Marseilles (Bear Island).....	9	57 $\frac{1}{2}$
Boyston's Tavern.....	4	61 $\frac{1}{2}$
Clear Lake.....	4	65 $\frac{1}{2}$
East St. Cloud (Brantford P. O.).....	9	74 $\frac{1}{2}$
SAUK RAPIDS.....	3	77 $\frac{1}{2}$
Watab.....	5 $\frac{1}{2}$	83
Langola.....	12 $\frac{1}{2}$	95 $\frac{1}{2}$
Swan River.....	10	106 $\frac{1}{2}$
Little Falls.....	3	108 $\frac{1}{2}$
Belle Prairie.....	5 $\frac{1}{2}$	114
Olmstead's.....	8 $\frac{1}{2}$	122 $\frac{1}{2}$
Mouth of Nokay river (opposite Fort Ripley).....	$\frac{1}{2}$	123
CROW WING.....	7	130
Chippewa Agency at Gull River.....	4 $\frac{1}{2}$	134 $\frac{1}{2}$
Opposite mouth of Long Prairie River.....	12 $\frac{1}{2}$	147
Commencement of Grand Marais, end of built road	5	152
Crossing of Crow Wing River—Wadena.....	8 $\frac{1}{2}$	160 $\frac{1}{2}$
Crossing of Wing River.....	9 $\frac{1}{2}$	169 $\frac{1}{2}$
Crossing of Bluff Creek.....	12 $\frac{1}{2}$	182
Commencement of Leaf Mountain.....	6	188
Outlet of Leaf Lake.....	5	193
Leaf City (three or four houses).....	2	195
Otter Tail City (to left of road).....	5 $\frac{1}{2}$	
First crossing of Otter Tail River (Rush Lake).....	7	202
Second " " " " "	16	218

End of surveyed line, Odometer measurements.

Third crossing of Otter Tail River	43	222
Detroit Lake—North shore	10 $\frac{1}{2}$	233
Lake Floyd (Eagle's Nest Lake)	6	280
North end of small Lake to left of road *	2 $\frac{1}{2}$	241
Timbered Lake to left	5 $\frac{1}{2}$	246
Buffalo River, 10 feet wide, 1 foot deep	5 $\frac{1}{2}$	252
Dividing ridge, lake and timber	8 $\frac{1}{2}$	260
Junction of St. Cloud and Pembina trail	11 $\frac{1}{2}$	272
Crossing of Wild Rice River, 35 ft. wide, 2 ft. deep	5	277
Crossing of Wild Rice Creek, 15 ft. wide, 1 ft. deep	5	282
Crossing of Sand Hill River, 30 ft. wide, 1 $\frac{1}{2}$ ft. deep	19 $\frac{1}{2}$	301
Crossing of Sand Hill Creek, 12 feet wide	6	307
Bad Marshes	14	309
Stony Butte and Lake	11 $\frac{1}{2}$	321
Small Creek, water in holes	8 $\frac{1}{2}$	324
Crossing of Red Lake River, 175 feet wide, 3 $\frac{1}{2}$ feet deep	4 $\frac{1}{2}$	329
Small Lake and Marsh	11	340
Small Lake	4 $\frac{1}{2}$	345
Coulée	12 $\frac{1}{2}$	357
Crossing of Snake River	4	361
Crossing of Middle River, 20 ft. wide, 6 in. deep	7	368
Crossing of Pine River, 15 ft. wide, 1 ft. deep	6	374
Bend of Pine River	4	378
Small Creek?	6 $\frac{1}{2}$	386
Big Point	15 $\frac{1}{2}$	400
South fork of Two Rivers	6 $\frac{1}{2}$	406
Mouth of Two Rivers	5	411
Pembina	12 $\frac{1}{2}$	424

A brief description of the route is given in my Report on the Red River Expedition of 1857, page 384, 391.

Once at Pembina, two routes lie open to the travellers. One by Fort Garry, and thence to Fort Ellice by the trail north of the Assiniboine, the other by St. Joseph's and the

* From this point to Pembina, the distances are those given by Colonel Noble, 1859.

Little Souris Crossing ; thence by the west bank of the Assiniboine to Fort Ellice. The first is the safest, but longer than the route by St. Joseph. The difference in length is however more than compensated by the safety of the route, as the Little Souris is often frequented by Sioux, who it will be remembered are the enemies of the half-breeds and of white men generally. At the Settlements on Red River, it is also extremely probable that two or three half-breeds would be glad to accompany the party, and the knowledge they possess of prairie travelling, their familiarity with the habits of Indians and with the language of the Crees, through whose country the greater part of the trail runs, would be of very great advantage to any party. With ten or twelve half-breeds associated with the party there would be no danger in attempting to go straight across the prairies between the north and south branches of the Saskatchewan, through the country of the Blackfeet and Piegan, but without these admirable guides it would scarcely be advisable to attempt that route, and consequently the longer and more northerly trail, by Carlton, Edmonton, and Rocky Mountain House, would have to be adopted.

Either at St. Joseph or at the Settlements at Red River, a few horses may be picked up, but the price will no doubt be high, from \$70 to \$100, as the demand is very great at this time, and the half-breeds have not anticipated the requirements of the present season by procuring horses from the Indians or from the settlers at the Mission of St. Ann, on the Saskatchewan, who are well provided with these useful animals. It is not improbable, however, that a small emigration

may take place from Red River to the Cariboo and Kootanie gold fields this season, and if this be the case, the half-breeds will be glad, no doubt, to dispose of some of their stock. Hence it may occur that horses and oxen are cheaper than usual, but it would not be wise to rely on this contingency, more especially as many parties of twenty or more each, are now organizing in Canada and the States for a journey across the Prairies to the gold fields of British Columbia.

FORT GARRY TO FORT ELICE, *via* THE WHITE MUD RIVER TRAIL.

	MILES.
FORT GARRY.—Camp on the prairie. Good pasturage.....	0
LANE'S POST.—Good trail through a fertile country, partially settled. Fine prairies adapted for grazing and agriculture. Clumps of poplar. Heavy timber in the bays of the river.....	24
Camp at a stagnant pool in the shelter of a bluff of poplar. Good grass. Heavy timber skirting the river.....	16
PRairie Portage.—200 inhabitants. Cross a level prairie with rich soil and herbage, but nearly destitute of trees. Good grazing.....	19 ¹
PRairie Portage to Rat River.—Fine open treeless prairie. No wood. Splendid pasturage.....	16 ¹
Rat River to Ford of White Mud River.—Very fine agricultural country, diversified with beautiful woodlands and extensive, open meadows. Grass and many varieties of plants wonderfully luxuriant. Crossing at Rat Creek bad; deep mud.....	14 ¹
Crossing of White Mud River.—(55 feet wide, 4 feet deep in August.) Fine grass and timber; trail follows bank of White Mud River, then through a rich prairie country, with many wet meadows, and woods of aspen.....	25
North Bank of White Mud River.—Fine timber. Come on the flanks of the Riding Mountain, and traverse a rich undulating country; excellent pasture; oak trees.....	23
Fine country to the Little Saskatchewan, at the foot of the Riding Mountains. River 48 ⁴³ feet wide, 3 feet deep, current $8\frac{1}{2}$ miles an hour (Aug. 28th). After crossing the Little Saskatchewan the country is thickly covered with willows and aspen; excellent pasturage in the valley; scenery beautiful.....	21

Fine rolling-country. Ponds very numerous; duck in great abundance; junction of upper and lower trails..... 25
Open country, with excellent pasture all the way to Fort Ellice. 50⁴

Fort Garry to Fort Ellice on Beaver Creek, via the White Mud River Trail 236

It would not be safe to rely upon getting any provisions at Fort Ellice; they are generally "starving" during the early summer, awaiting the supplies of Buffalo meat from the prairies. The route from Fort Ellice will depend upon the determination of the party to take a course direct to the Kananaski Pass, via the Qu'Appelle and the south branch of the Saskatchewan, or by the Touchwood Hills, Carlton, and the Rocky Mountain House, to the Vermillion Pass. If the party is strong, and accompanied by half-breeds, the shortest way will no doubt be through the Blackfeet and Piegan country; but if there are no half-breeds in company, the route should be by the Touchwood Hills and the north branch of the Saskatchewan. I shall first describe the route *via* the Qu'Appelle and the South Branch.

FORT ELLICE TO THE ELBOW OF THE SOUTH BRANCH OF
THE SASKATCHEWAN.

Light sandy prairie, with occasional clumps of small poplar, and several marshes and ponds..... 71
Traverse an undulating prairie of light sandy loam with scattered clumps of poplar and willow. Halt to feed after travelling nine miles. Rolling prairie of rich sandy loam, clothed with an exuberant growth of excellent grass. Halt at the Cross Woods, an open belt of light aspen; marshy ponds surrounded by light prairie succeed..... 25⁴
Traverse a light rolling prairie with gravelly ridges thinly wooded with scattered aspens, succeeded by a wide treeless plain of rich sandy loam. Undulating prairie of light sandy loam, with occasional clumps of small poplar and many ponds. Here a vast treeless prairie stretching to the Qu'Appelle begins..... 28

Light undulating open prairie, succeeded by a treeless rolling prairie. Weed or Bear Berry Ridge, camp on an undulating prairie, with clumps of poplar and willows. Soil of prairies traversed, light with gravelly ridges. Areas of rich loam with good grass in the depressions. Abundance of water in numerous ponds dotting the plain. Wood scarce. Trail runs parallel to the Qu'Appelle at a distance of 12-16 miles.....

264

Halt after 12 miles travel over a vast treeless rolling prairie, with soil and herbage as before. From this station on an open plain, the woods of the Qu'Appelle, 12-18 miles off, may be seen. "Indian Head Hills" succeed. PASS THE QU'APPELLE FORT TRAIL; course lies over a light treeless undulating prairie, sloping gently towards the Qu'Appelle, and intersected by several creeks flowing in deep valleys. Plenty of wood, water and grass.....

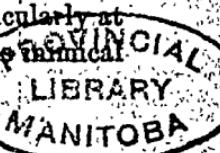
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A vast level prairie, with dark, rich soil, bearing luxuriant grass, followed by a light, undulating prairie with many knolls, ridges, and ponds. Church of England Missionary Post at the Fishing Lakes, Qu'Appelle Valley. Good grazing in the Valley.....

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It is by no means necessary to go to the Qu'Appelle Mission. The trail to Qu'Appelle Fort, referred to in a preceding paragraph, may be pursued on towards the Forks of the Qu'Appelle, and the route to the Elbow of the South Branch may follow either side of the river. The south is perhaps equally as good as the north side, which I followed in 1858, although the gullies are not so deep, but buffalo are more numerous on the south side than the north. On approaching the Sandy Hills it will be advisable to keep a sharp look-out for Blackfeet and Plain Crees, especially the latter, who are certain to be seen in considerable numbers, this being their hunting ground during the summer months, when they employ themselves in running and impounding buffalo, particularly at the Sandy Hills. The Plain Crees are by no means



to the whites; their chief is named WA-GOOSH or "The Fox;" the chief of the Sandy Hills is MISTICKOOS or "Short-stick." It would be advisable to make them a small present of tobacco, tea, powder and ball.

The following are the distances:—

	MILES.
QU'APPELLE FORT TO THE FORKS. — Good pasturage, wood and water	45
Cross the Qu'Appelle at the Forks and ascend to the north side.	
Light prairie, short grass	18 ¹
Undulating prairie of light sandy and gravelly soil, with poor short grass. Wood and water in ravines. The trail retreats two or three miles from the Qu'Appelle to head the deep gorges and ravines leading into it. No wood. Prairie light sandy soil. Herbage scrubby and scant	21
Arrive at the "Outlook" and Buffalo Pound Hill, then at Buffalo Pound Hill Lake. Wood, water, and good grass, in the gullies only.	24 ¹
Trail keeps away from the river to head the ravines. Prairie of light sand with numerous boulders. Grazing poor. Wood and water scarce. Buffalo probably visible	20
Sterile and stony buffalo plain, poor grass, no water for some miles. Sand Hill Lake, with good grass in the flats. Sand Hill Lake is salt. A spring on the south side on the hill near the east end of Sand Hill Lake. Wood very scarce. Cross the Qu'Appelle,	15 ¹
Re-cross the Qu'Appelle valley after five miles. Plenty of water among the Sandy Hills. Grazing indifferent	8 ¹
North bank of the "River that Turns" to the Elbow of the South Branch. Good wood, water and pasturage. Cross the "River that Turns," near its mouth, and proceed to ford about half a mile above its junction with the South Branch of the Saskatchewan.	11
From Fort Ellice to the Elbow of the South Branch of the Saskatchewan, near the Qu'Appelle River	29 ⁵
From Fort Garry to the Elbow of the South Branch	53 ¹
From St. Paul to the Elbow of the South Branch, <i>via</i> Fort Garry	95 ⁵

After passing the south branch of the Saskatchewan at the Elbow, the travellers enter a region in which there is not only

no trail, but frequently difficulty in procuring pasture and wood. The best course is to keep within two or three miles of the South Branch as far as the old Hudson Bay Company's Post, Chesterfield House, now abandoned, a distance of ninety miles. From Chesterfield House the course is by the banks of Red Deer River. With the exception of the deep and narrow valley of Red Deer River, the prairie is a sterile and barren country, with scanty herbage and no wood, but there is good feed on the high plateaus to the north. The country drained by the South Branch and its tributaries south of the wooded region, shown on the map as the 'Fertile Belt,' is an arid treeless region. On the elevations, four hundred feet above the plain, the aspen and willows occur in patches together, with good grazing ground. The Indians who hunt on these arid plains are the Blackfeet, the Bloods, and the Pie-gans. Capt. Palliser thus describes the Blackfeet:

"Owing to my having been so much in the Blackfoot country, both in the summer of 1858 and the winter of 1858-9, all the chiefs and principal men know me, and frequently said to me, 'Desire us to do anything you please and we will do it.' Doctor Hector has also acquired a great influence among them by removing some trifling complaints from the men, and a great success in his profession among the women and children. Neither is this friendly feeling confined to the Blackfeet alone, for both Pie-gans and Blood Indians, whenever they came in any numbers to visit me, always rode unarmed into my camp, which is the greatest compliment that these Indians can possibly pay.

"We have now travelled through the whole of their territories, a portion of country so dangerous as to be almost inaccessible, and we have neither had a horse stolen or a gun pointed at us by any of these tribes. However, I do not wish to infer that a total stranger would be equally safe, nor that any one accompanied by a military force (unless that force were a very large one) would also be safe; I think in either case they would run a very great risk of having all their horses stolen. These Indians tent in very large camps, from 400 to 600 tents together." — *Blue Book, 1860.*

Red Deer River can be followed up to the junction of a small tributary passing to Slaughter Camp, shown on the map, and from this place the course will be to Old Bow Fort or Bow River.

From Bow Fort two passes are open to the Kootanie River and the Columbia River—one the KANANASKI Pass, which leads directly to the Kootanie, the other the VERMILLION Pass, which first touches the Kootanie River, and then by the Kicking-horse Pass leads the traveller to the Columbia. Gold has been found on the Kootanie, and a "rush" of miners has already taken place to the valley of this river. Capt. Palliser thus describes the KANANASKI Pass:

THE KANANASKI PASS.

"On the 18th of August I started to seek for the new pass across the Rocky Mountains, proceeding up the north side of the south branch of the Saskatchewan or Bow River, passing the mouth of Kananaskis River. Five miles higher up we crossed the Bow River and entered a ravine. We fell upon Kananaskis River and travelled up it in a south-westerly direction, and the following day we reached Kananaskis Prairie, known to the Indians as the place "where Kananaskis was stunned but not killed." On the 21st we passed two lakes about two miles long and one wide. We continued our course, winding through this gorge in the mountains among cliffs of a tremendous height, yet our onward progress was not impeded by obstacles of any consequence; the only difficulty we experienced was occasioned by quantities of fallen timber caused by fires. I observed that many, indeed most of these tremendous fires are caused by lightning, and in one or two places traced their progress where the foot of man could never have trod.

"On the 22nd of August we reached the height of land between the waters of Kananaskis River and a new river, a tributary of the Kootanie River. We remained here for the rest of the day, occupied with observations. Our height above the Bow Fort was now 1,885 feet, or above the sea 5,985 feet. Next morning we commenced our descent, and for the first time we were obliged to get off and walk, leading our horses down a precipitous slope of 960 feet over loose angular fragments of rock. This portion over, our route continued for several days through

dense masses of fallen timber, destroyed by fire, where our progress was very slow, not owing to any difficulty of the mountains, but on account of the fallen timber, which we had first to climb over and then to chop through to enable the horses to step or jump over it. We continued at this work from daybreak till night, and even by moonlight, and at length reached the Columbia Portage on the 27th of August. Here I devoted a day to ascending some heights in search of a view of the Columbia River. After climbing several mountains in rain, I at last was astonished to find myself right upon the bank of the lake from which the Columbia rises, at a height of about 2,800 feet, over the surface. Climbing a high tree in order to overlook the woods which intercepted my view, I saw both the Columbia-lakes, the Columbia rising out of the southern, flowing into the northern one, out of which it bends to the westward previous to taking its northern course to the boat encampment. The most southerly of these lakes is in lat. $50^{\circ} 7' N.$, long $115^{\circ} 50' W.$ "

The Kananaski Pass is the one which Sir George Simpson traversed, and is described in his overland journey round the world. About fifty emigrants from Red River went through this pass many years since, but both Sir George Simpson and the emigrants made their way to the Columbia River in the United States territory, far south of the Cariboo gold region, passing through the auriferous valley of the Kootanie, little suspecting that this mountain river would soon be alive with "prospectors" or miners, and its deep solitudes disturbed by the rude and motley train which generally follow the gold-seekers.

Dr. Hector travelled from Bow River to the Columbia by the Vermillion Pass, which he describes as follows:—

THE VERMILLION PASS.

"The site of Old Bow Fort is marked only by a group of mud and stone chimneys, the remainder of the fort having been constructed of timber, all of which has long been removed and used by the Indians as firewood. A small stream joins the river from the west at this place,

and the main stream itself makes a bend from a north to an easterly course. Bow Fort is 4,100 feet above the sea.

"On the 11th August M. Bourgeau and I started and camped together about 11 miles up the valley of Bow River, on the banks of a lake formed by a dilatation of the river in consequence of the valley being barred by immense deposits of rounded shingle. Our road was rather a bad one, on account of the fallen timber which impeded our path, the valley not having been frequented by the Indians for many years.

"This first portion of the valley cuts through five parallel ranges of mountains, at right angles to their axis. These are composed of beds of crystalline and compact fossiliferous limestone (most likely of carboniferous age) dipping at 80° to W. S. W., but having several obscure plications. Two well-marked peaks occur on either side of the valley, which M. Bourgeau named 'Grotto' and 'Pigeon' peaks.

"After passing the former of these, the following morning (having taken leave of M. Bourgeau, who remained to examine this mountain) I entered a wide trough-like valley, running to S.S.E., through which I contrived to follow up Bow River in the opposite direction for three days. This trough continues to run through the mountains, beyond the points where the river leaves and enters it; the latter being between 'Cascade' and 'Rundle' mountains.

"'Cascade' Mount which is known to the Indians as the 'place where the water falls,' rises as a series of precipices to the height of 4,521 feet above a small level plain at its base, and is so abrupt that its summit is in view at a horizontal distance of 2,200 yards. It may be taken as a type of the mountains in this portion of the chain, all being equally precipitous and inaccessible.

"From the Cascade Mount the river valley again changes its direction passing at right angles to the chain so as to cross the 'Saw-back' range, which are composed of the same strata as before, but now almost vertical, having only a slight inclination to W.S.W.

"After following up the valley which then was reached, to N. W. for three days, on the 18th I arrived at 'Castle' Mount, opposite the entrance to the 'Vermillion' Pass. I had already passed three small tributaries, by following up either of which, the height of land can be crossed to the Kootanie River, but judging from Indian report, none of these were so promising as this one, by which I now resolved to cross the water-line of the mountains.

"The mountains now began to wear a different aspect, more massive, and evidently much loftier. They are composed of white and pink quartzose sandstone, almost passing into a quartzite in some parts, and in others into a fine conglomerate.

"On the 20th I crossed Bow River, without swimming the horses and unloading their packs; and, after a six hours' march through thick woods, reached the height of land the same afternoon.

"By careful barometric readings I found the rise from the river to be 539 feet; and I consider the rise of the river, to where I crossed it from the Old Bow Fort camp, to be 300 feet, thus giving for the height of land 940 feet. The small stream along which we had ascended here ends in two small lakes, the water of which is beautifully clear; and 200 yards further on, and at 17 feet above the level of the upper lake, we came on a rapid turbid stream, flowing to the S.W., which was the head of the Vermillion River, the principal branch of the Kootanie River.

The height of the land is in $51^{\circ} 8' 30''$ N. longitude by account $116^{\circ} 85' W.$ It is in a wide valley, between outlying shoulders of two snow-clad mountains, which I named after Mr. Ball and Colonel Lefroy, the latter being to the west. The ascent to the watershed from the Saskatchewan is hardly perceptible to the traveller who is prepared for a tremendous climb, by which to reach the dividing ridge of the Rocky Mountains, *and no labour would be required, except that of hewing timber to construct an easy road for carts, by which it might be attained.*

"The three following days were occupied in the descent of Vermillion River, which, after flowing to S.W. by W. for nine miles, suddenly changes its course to S.E. for 18 miles, when it again changes to S., escaping into a wide valley to join a much smaller stream, which is the Kootanie River.

"In its course of about 40 miles, it descends 1,227 feet, so that at its junction with the main stream it is 388 feet below the Old Fort.

"It becomes of considerable size a very short way from its source, as it receives large tributaries from glaciers which occupy the valleys of Mounts Lefroy, Ball, and GoodSir. The valley through which it flows is contracted only at one point — 'The Gorge,' near its lower part, where two lofty mountains seem to close in on the stream, without, however, in reality causing any great difficulty in passing along its base.

"*A road for carts down the valley of Vermillion River, from the height of land to the Kootanie River, could be cleared without difficulty, or, supposing the road to follow a straight line along the river, and the descent to be uniform, which it almost is, the incline would only be 40 feet in a mile, or 1 in 185.*

"The absence of any abrupt steps, either in the ascent or descent, together with the small altitude to be passed over, form very favourable points in the consideration of this pass as a line of route.

"Ascending the Kootanie River on the 27th, I reached the height of land which divides it from one of the principal tributaries of the Columbia.

River, called Beaver Foot River. The watershed is in a large morass, with several lakes occupying the bottom of a deep wide valley, common to the two streams, although flowing in opposite directions. The line of watershed is so little marked that it is impossible to cross even on foot between the two streams without going in water.

It is on the 51st parallel of latitude, in longitude $117^{\circ} 10' W.$ On the north side of the valley are Mount Goodsir and Pyramid Mountain, and on the south is the Brisco range which although of no great elevation (about 2,000 feet above the eye) run, as an unbroken wall, to S.S.E. My Indian declared that the river we had now struck was the head of the north branch of the Saskatchewan, and wished to follow it down, but if my barometer and sympiesometer were acting with any approach to accuracy we were now about on a level with what I had found to be the elevation of the Mountain House during last winter, so that this could not be the case. In addition, the change in the vegetation, especially the occurrence of cedar, convinced me that we were really on a branch of the Columbia.

"I accordingly only followed it for two days, and on 29th reached the mouth of a large tributary, to N.W. This river is much larger than the Vermillion River, and about four times the size of the stream into which it flows, being about equal to the south branch at the point when we left it.

"Here I received a severe kick in the chest from my horse, rendering me senseless, and disabling me for some time. My recovery might have been much more tedious than it was, but for the fact that we were now starving, and I found it absolutely necessary to push on after two days.

"Where it receives Beaver Foot, Kicking Horse River bends back on itself, including an angle of only 20° , and after passing over a fine fall of about 40 feet flows on to the N.W.

"The mouth of Beaver Foot River is about 318 feet below the height of land where we first struck it.

"As I was quite unable to move, I sent my interpreter, Peter Erasmus, to ascend Mount Hunter, which is included in the angle of Kicking Horse River. He ascended for 3,496 feet, and obtained a view, to the west, of snow-clad peaks as far as the eye can reach. Over the tops of Brisco's range, and all to the left of S.W., he could perceive no mountains, so that if that portion of country is occupied by any they must be of very inferior altitude.

"While traversing this valley, since coming on the Kootanie River, we have had no trail to follow, and it did not seem to have been frequented by Indians for many years. This makes the absence of game all the more extraordinary. The only animal which seemed to occur at all was

the panther. The Indian saw one, and in the evenings we heard them calling as they skirted round our camp, attracted by the scent.

"The bottom of the valley is occupied by so much morass, that we were obliged to keep along the slope, although the fallen timber rendered it very tedious work, and severe for our poor horses, that now had their legs covered by cuts and bruises.

"The timber along Beaver River is mostly young, but there are the remains of what had been a noble growth of forests, consisting of cedar, pine, and spruce, among the latter of which is the magnificent prusche, which sometimes reaches four yards in circumference. I also saw a few young maples (*Negundo fraso*.) Berries of many kinds were very abundant, and, indeed, had it not been for this we would have suffered much from hunger."

HOWSE'S PASS.

In 1859 Dr. Hector crossed the mountains by Howse's Pass, and went up the Columbia to a point within a few miles of the Boat Encampment, near to the Athabasca Pass. Howse's Pass is thus described by Dr. Hector.

"From the site of Bow Fort I followed up my track of the preceding summer, along the valley of Bow River, until I reached Castle Mount, opposite the Vermillion Pass. Instead of crossing the watershed at this place, the hope of procuring game and adding to my stock of provisions, to which up to this time we had avoided having recourse, induced me to get to the north-west as far as possible, keeping on the eastern slope of the mountains. I accordingly passed from the South to the North Saskatchewan by the Pipe Stone Pass, which is further to the east than the Little Fork Pass, by which I crossed this tranverse divide in the preceding summer. This pass follows up a small tributary to Bow River from the north, and after having traversed a height of land at an altitude of about 7,000 feet, descends what I name the Siffleur River to the north branch of the Saskatchewan at the Kootanie plain. Here I left my Indians, as they had by their hunting added 70 lbs. to my store of pemmican, and they were now likely, from the nature of the country I was about to traverse, to consume more than they would kill.

"Altering my course to the S.W., I followed up the Saskatchewan to its source, and searched for a pass to the Columbia, of the existence of which I had been informed by the Indians.

"Choosing the middle fork, I found it to rise in three branches, two of which are derived from immense glaciers, while the third is merely a

small stream, issuing from a wide valley, the bottom of which is level and heavily wooded, and without any perceptible dividing ridge gives rise also to a branch of the Columbia flowing to the south.

"This height of land is at an altitude of about 4,800 feet, and is in lat. $51^{\circ} 40' N.$, long. $117^{\circ} 30' W.$ In reaching it the ascent is imperceptible, but the valley of the great fork is closely hemmed by lofty precipices, its whole width of about half a mile being occupied by shingle deposits, showing that during the floods the channel of the river must be of great breadth, and the valley almost impassable.

"One of the glaciers in which this river rises is of magnificent dimensions, even exceeding those of the one at the Glacier Lake, which was examined the preceding summer. It must be at least nine miles long and three wide, and descends from the same 'mer de glace' that envelopes the higher portions of the mountains for a considerable way to the north.

"On 7th September I commenced the descent to the Columbia by Blueberry River, a stream which rapidly increases in size, and descends about 2,000 feet through a very contracted valley in its course of about 35 miles. At various points we found traces of an old trail, which had evidently been out of use for many years, so that I have no doubt that this was the pass traversed by Howse in August 1810, as laid down in Mr. Arrowsmith's most recent maps. It was at that time used as a portage route from the east to the west side of the mountains, but was abandoned in favour of the more northerly route by the boat encampment.

"The difficulties of descending this valley are very great, arising from the density of the forest growth, and the contraction of the valley at various points by rocky barriers. We were occupied nine days in descending a distance of 35 miles to its mouth, which is in lat. $51^{\circ} 26' N.$, long. about $117^{\circ} 50' W.$ Where it enters the valley of the Columbia River, Blueberry River winds over immense flats of rounded shingle, testifying to the amount of material brought down from the mountains by the spring floods.

"The Columbia at the point where we struck it is flowing to N.W., about 210 yards wide, and very sluggish and deep. Its valley is from three to four miles wide, and bounded by mountains, which to its right rise from 3,000 to 4,000 feet above its level, but on the left are 1,000 feet lower.

"A range of low hills occupy the centre of the valley, through which Blueberry River passes in a deep rocky cañon before joining the main stream. It was now my wish to follow the Columbia River down to its great bend at the boat encampment, and thence following up the valley

of Canoe River, endeavour to pass to the head waters of the Thompson's River, and so reach British Columbia. The valley of the river appears to be wide; and the mountains seem so open with rolling outline, that I did not anticipate any great difficulty in following such a course, if it had not been for the density of the forest. I spent some time in searching for any trace of a trail leading in the direction I desired to follow, but failed, as the Shooshewap Indians who inhabit this region of country travel solely by canoes, and keep the very few horses which they possess in the neighbourhood of the Upper Columbia Lakes."

There appears to be little doubt that with the use of the axe a party could without difficulty make their way with horses, if not with carts from the point where Dr. Hector returned from the Columbia, after having gone through Howse's Pass, (or what would be better still, through Vermillion Pass,) towards the Boat Encampment and the mouth of Canoe River. The Columbia is navigable with boats far above this point, and Canoe River comes from the boundary of the present known limits of the Cariboo gold region, and there is every probability that it is also auriferous. Canoe River and its valley must become an all important point, for it leads directly to the Cariboo country. It has been visited, and part of it described by Mr. Ross in his "Fur Hunters." He visited this river from the She-waps on the Thompson River, coming across the land, in 1816. Canoe River is 40 yards broad at its mouth.

All the passes through the Rocky Mountains, with the single exception of the Vermillion Pass, are distinguished by a gradual slope to the east and an abrupt and difficult descent to the west. This fact points out the **VERMILLION PASS** as the one which will probably be ultimately adopted as a waggon route across the mountains. Although Howes's

Pass is much obstructed with timber, yet it possesses one advantage—the road to it lies through the valley of the North Branch of the Saskatchewan, and it may be approached by the northern or wood route, *via* Carlton, Edmonton, and Rocky Mountain House. For a distance of seventy miles of its course through the mountains, this great river flows in a wide valley deeply filled with drift, which, by the way, is, very probably highly auriferous, as gold has been found in several localities. On the banks of the North Branch in the mountains there is always level ground owing to the deep drift, and it sometimes expands into wide plains, as the Kootanie Plains, where pasturage is good and game very abundant. The valley of the North Branch cuts through the mountains more directly than that of the South Branch, and is accordingly much shorter.

THE KOOTANIE PASS.

The direct approach to the Kootanie Pass, near the 49th parallel, is through a very poor country, between longitudes 109° W. and $113^{\circ} 40'$. It is a level, sandy, arid plain, with little water, and even that doubtful supply, brackish. The herbage is poor and scanty. The Kootanie Pass is practicable for horses, and is frequently used, being approached from Bow Fort; it is not so good as the Kananaski or Emigrant Pass. One trail from it leads to Kootanie Post, in the United States Territory, another trail goes up the Kootanie River and thence to the Columbia by the Columbia Lakes, and a third to Flat Bow Lake and thence to Fort Shepherd. The country between the Kootanie River and Flat Bow Lake is very

favourable for a road, but is much obstructed at the present time with fallen and burnt timber. There are no sudden rises or descents, and were it not so near the boundary line, and so far removed from the accessible portion of British Columbia, it would probably become a valuable line of communication. It is, however, 200 miles south of the Cariboo Gold Region.

The leading dimensions of the Kootanie Pass are stated by Captain Blakiston to be approximately as follows:—

The extremity of the Kootanie Pass on the east side of the Rocky Mountains is 40 and on the west side 18 English miles to the northward of the international boundary. "Its length is 40 geographical or nearly 47 English miles, extending from longitude $114^{\circ} 34'$ to $115^{\circ} 24'$ west. It leaves the Saskatchewan Plains where they have an altitude of about 4,000 feet above the sea, rises 2,000 feet to the watershed of the mountains, descends to Flathead River, again to an altitude of 4,000, follows up this river to its head waters, then crosses a precipitous ridge, reaching an altitude of 6,000 feet; it then descends the great western slope, falling 2,000 feet in two miles of horizontal distance, after which, by a nearly uniform grade of 100 feet per geographical mile; it gains the Tobacco Plains at the point where the Wigwam branch enters Kootanie or Elk River.

"On the Kananaski or Lake River are the remains of many wooden carts which were abandoned by a party of emigrants from Red River Settlement, under the late Mr. James Sinclair, on their way to the Columbia in 1854, who found it impossible to drag them further into the mountains. This pass follows the course of the river to its source, and is the one by which Sir George Simpson, governor of the territories of the Hudson's Bay Company, as well as another party of emigrants, crossed the Rocky Mountains in 1841."

"The forests consist of spruce, a small pine, also a few balsam poplar and aspen. In travelling through these mountain forests, the greatest obstruction is the fallen timber, which, lying about in all directions, causes much exertion to the horses, and confines them to a slow pace." During the traverse Capt. Blakiston noticed the devastating effects of a tempest: "numbers of trees had been blown down; and many broken short off. The work of destruction had evidently been of that year, but there were also signs of former work of the same character."

THE ATHABASCA PASS.

This is the most northern pass practicable for horses; it is very abrupt on the western side, and leads to the mouth of Canoe River or Boat Encampment. It may be approached from Rocky Mountain House, from which place a Hudson's Bay Company's trail leads to and through it. Mr. J. Miles went through this Pass on horseback as far as Boat Encampment, in 1854, but he describes it as "very hard riding." Although this Pass leads directly to Canoe River, the nearest approach to the Cariboo region, yet the country by which it is approached is thought not to be so favourable nor so short as the approach to the Howes's or the Vermillion Pass.

A full description is given of the Athabasca Pass in Ross's "Fur Hunters." He traversed it in the spring when the snow was deep, also on returning on horseback. There is an immense difference between the journey in Spring and in Autumn. When the snows melt the rivers are full, the rocks are slippery, melting ice meets the eye in all directions, and everything is cold, wet and comfortless. In autumn or the close of summer all is changed. For foaming torrents you have rippling brooks; for cold, storms and clouds, a bright clear sky and warm genial nights; ice and snow far above on the mountain tops.

"To give," he says, "a correct idea of this part of our journey let the reader picture in his own mind a dark narrow defile, skirted on one side by a chain of inaccessible mountains, rising to a great height, covered with snow, and slippery with ice from their tops down to the water's edge. And on the other side a beach comparatively low, but studded in

an irregular manner with standing and fallen trees, rocks and ice, and full of drift-wood, over which the torrent everywhere rushes with such irresistible impetuosity that very few would dare to adventure themselves in the stream. Let him again imagine a rapid river descending from some great height, filling up the whole channel between rocky precipices on the south and the no less dangerous barrier on the north. And lastly, let him suppose that we were obliged to make our way on foot against such a torrent, by crossing and re-crossing it in all its turns and windings from morning till night, up to the middle in water, and he will understand that we have not exaggerated the difficulties to be overcome in crossing the Rocky Mountains."

Such is the description given of part of the Athabasca Pass in the Spring. Ross says that at the proper season the Athabasca Pass can be travelled from one end to the other on horseback, with the exception of one or two steps on the Grand Côte.

The following enumeration shows all the known passes in the Rocky Mountains, between the plains of the Saskatchewan and British Columbia:—

1. Cow Dung Lake Portage, or "Leather Pass".....	Latitude 54° 0'
2. Boat Encampment or original Athabasca Portage..	" 53° 0'
3. Howse's Pass.....	" 51° 45'
4. Kicking Horse Pass, from South Branch to the Columbia.....	" 51° 25'
5. Vermillion Pass, from South Branch to the Kootanie River.....	" 51° 10'
6. Kananaski or Emigrant Pass, from South Branch to the Kootanie River.....	" 50° 40'
7. Crow Nest Pass.....	" 49° 40'
8. Kootanie Pass	" 49° 25'

To these may be added: From the Kootanie River to the Columbia, the Lake Pass and Beaver Foot Pass; from the South Branch of the Saskatchewan to the North Branch, the Little Fork Pass and the Pipe-stone Pass.

The following are the altitudes of the principal passes above the sea:—

Kicking Horse Pass.....	Above the Sea	5,420 feet.
Vermillion Pass.....	" "	4,944 "
Kananaski Pass.....	" "	5,985 "
Kootanie Pass.....	" "	6,000 "

THE NORTHERN ROUTE *via* EDMONTON AND ROCKY MOUNTAIN HOUSE.

Starting from Fort Ellice, this route passes through the beautiful scenery of the Touchwood Hills by a well beaten trail, and thence on to the South Branch of the Saskatchewan, south of the Lumpy Hill of the Woods, shown on the map. The river here is deep and rapid, but not more than 180 yards broad. It cannot be forded, but supplies can be ferried across by means of a temporary boat made out of a cart wheel, or two tied together, and oil cloths. The horses will swim across without trouble. The carts must be floated and towed across. The distance from Fort Ellice to the crossing of the South Branch is about 280 miles, or 516 from Fort Garry. The road is excellent, wood and water abundant, and in the Touchwood Hills, and north and west of them, ducks and geese are innumerable. If this route is selected, the Assiniboine should be forded above the mouth of the Qu'Appelle, as the Qu'Appelle crossing is bad, the river being

deep and the banks muddy. It will probably be unnecessary to touch at Carlton, no advantage is to be gained by doing so except assistance in crossing the North Branch of the Saskatchewan, if the north side should be preferred to the route by the Eagle Hills. From Carlton there is a Hudson Bay Company's trail all the way to the Rocky Mountain House, via Fort Pitt and Edmonton. It lies chiefly on the north side of the river, and is the safest route, as the Blackfeet do not generally cross the river, but in the summer keep to the open plains following the buffalo. The route by Battle River to Rocky Mountain House is much the shortest, but Battle River is frequented by Blackfeet and Plain Cree Indians, and it would be desirable, if possible, to procure a guide at Edmonton or at the R. C. Mission at St. Ann, fifty miles west of Edmonton. From Edmonton the route would lie to Rocky Mountain House and thence to the selected pass, the most favourable being the Vermillion Pass.

It is to be observed that Rocky Mountain House is not tenanted during the summer months. Edmonton is a large establishment, and the residence of a chief factor of the Hudson Bay Company. In 1859 it numbered 40 men, 30 women, and 80 children. St. Ann is a village of free men containing about 45 houses. Rocky Mountain House is about 100 miles from the main chain of the mountains, but their snow-clad peaks are visible from it. A subordinate range is 45 miles from the post, and the country between the two points is densely covered with a pine forest, through which Dr. Hector vainly endeavoured to penetrate.

THE INDIAN TRIBES OF THE SASKATCHEWAN VALLEY.

It is of some importance that travellers through the Saskatchewan plains should be familiar with the number, habits, and character of the Indians they may chance to meet. There is far less to fear from these wandering tribes, than is generally supposed, if they are approached without any signs of alarm, and treated with respect and reasonable consideration.

The Plain or Prairie Indians belong to the following principal tribes :

Blackfeet,	Crees,
Bloodies,	Assiniboines,
Piegans,	Sioux.
Fall Indians, or Gros Ventres.	

The Wood Indians of the Saskatchewan Valley belong to the great family of Crees and Ojibways. The Sioux, Blackfeet, Bloodies, and Piegans are Dakotahs.

Mr. Harriet, a chief factor of the Hudson's Bay Company, who had passed his life among the Blackfeet, estimated the six or seven tribes going by that general name as mustering 1,600 to 1,700 tents, at eight per tent, 13,000.

Mr. Rowand, one of the oldest resident traders, estimated the Blackfeet tribes as follows :—

Blackfeet proper	300
Piegans	400
Bloods	250
Gros Ventres, or Fall Indians	400
Circees	45
Cotones	250
Small Robes } Mountain Tribes	

At 8 persons per tent, 13,000 1,645 tents.

The Assiniboines are divided into Strongwood and Plain Assiniboines, or Stonys.

Mr. Harriet, in 1842, estimated the

Strongwood Assiniboines at 80 tents — 640

Mr. Rowand, the Plain Assiniboines " 300 " — 2,400

880 tents — 8,020

The Strongwood Crees about Edmonton

Mr. Rowand estimated at.....	400 tents, at 10 per tent	— 4,000
Crees of the Plains	200 " "	— 2,000
		6,000

On the North Branch of the Saskatchewan, where the Prairie Indians assemble, the following enumeration is given in the Parliamentary Blue Book:—

Locality.	No. of Indians.
Edmonton	7,500
Carlton.....	5,000
Fort Pitt.....	7,000
Rocky Mountain House	6,000

On the west side of the Rocky Mountains are the Kootanies, the Flatheads and the Shoushaps.

The Kootanies are not a numerous tribe; they are quiet, honest and brave, but peaceable towards the whites; their chief enemies are the Blackfeet. The Kootanies cross the Rocky Mountains every year in the spring and fall to hunt buffalo, and cure the meat for their winter-supplies. They are rich in horses, and not unfrequently trade with the Blackfeet. Nearly all the Kootanies are Roman Catholics. Capt. Blakiston says,—“They are perfectly honest, and do not beg, qualities which I have never yet met with in any Indians.” The Flatheads seldom come north of the 49th parallel. The Shoushaps travel on the upper part of Frazer’s River, and on the north fork of the Columbia; they have generally conducted themselves peaceably towards the whites, and it is with these Indians that a party crossing the mountains of the Vermillion Pass would come in contact as they approached the Cariboo gold diggings. The Blackfeet are like their neighbors the Stonys and the Crees, great thieves. Capt. Blakiston thus describes the Blackfeet:—

"On the 10th of September I turned my face towards Fort Edmonton, the previously appointed winter quarters of the expedition, which lay more than three hundred miles to the north, and as will be seen on the plan, passed several creeks, and over a country mostly prairie. I remained at the Forks of Belly River on Sunday the 12th. From this place I visited a camp of forty-five tents of Blackfoot Indians, accompanied by one of my men and 'James,' the Cree Indian. I was received with the usual hospitality, and having expressed a desire to change a horse or two, I had no trouble the following morning in exchanging one and buying another for ammunition, tobacco, blankets, old coat, &c. This tribe has the credit of being dangerous, but what I have seen of them, I consider them far better behaved than their more civilized neighbors the Crees. I made it a rule never to hide from Indians, and, although I had but a small party, to go to them as soon as I knew of their proximity. I also always told them for what reason the British Government had sent the expedition to the country; and I never failed to receive manifestations of good-will, neither was there one attempt made to steal my horses, a practice too prevalent among the Indians of these plains."

The Piegan Indians alone of all the tribes met by Dr. Hector showed any disposition to be "more than importunate."

THE CLIMATE OF THE ROCKY MOUNTAINS.

On the 18th September, 1858, Dr. Hector encountered several snow storms on the Upper Columbia, when searching for a trail up that river towards the Frazer, in the direction of Canoe River, a most important tract of country, connecting as before stated, the Plains of the Saskatchewan directly with the Cariboo gold diggings by the Howse's Pass or the Kicking Horse Pass and the Vermillion Pass.

"The winter of 1858-9 was unusually severe, as far as the quantity of snow is concerned, and yet the average depth of snow, when undisturbed, as in the woods, was only about eight to twelve inches throughout a large district between Battle River and the North Saskatchewan at Edmonton. Towards the mountains, in a south-west direction, the

quantity is still less; but during the early part of April, after the snow had nearly disappeared from Edmonton, a series of storms from the north visited the neighbourhood of Fort Pitt, so that in the middle of April there were from three to four feet of snow on the ground."—*Hector.*

"It is the belief," says Dr. Hector, "that the Columbia Valley is continued to the north, following the course of Canoe River that makes me so sanguine that by this route a passage could be effected into the valleys of either Thompson or Frazer Rivers." As far South as 51° N. this great valley is traversed with difficulty, on account of the spruce forests, which are of a northern character. After passing a bend which occurs in this latitude, the forest suddenly assumes a Californian aspect, free from underwood, and with stretches of open prairie clothed with bunch grass.

During the first week in September, 1858, Capt. Blakiston crossed the mountains of the Kootanie Pass. He found snow two feet deep 6,000 feet above the sea level. The following is his description of the journey:—

"After two or three miles we began a steep ascent, and were soon on ground entirely covered with snow, in which the tracks of the Kootanies who had gone before us were visible. We passed along the edge of a very steep hill, and it was as much as the horses or ourselves could do in some places to keep footing. We now descended, crossed a thickly wooded gully, and then commenced the ascent to the water-shed through thick woods. The snow increased in depth as we ascended, until, on arrival at the crest, it was two feet on the level, and in places heaped up to double that depth. It was cold work trudging through the snow in thin leather moccasins without socks; and, to make matters worse it was blowing and snowing all the time. I, however, on arriving at the watershed, with the assistance of the Indian 'James,' whom I always found most willing, unpacked the horse with the instrument boxes, and obtained a reading of the barometer, which gave an altitude of 6,080 feet. We ascended along the ridge about 100 feet more, and then by a zig-zag track commenced a deep descent. It was not, however, very bad, and we soon arrived at a small mountain torrent flowing eastward, thus

regaining the waters of the Atlantic after an absence of sixteen days. The trail continued mostly through woods down the valley due east. The rocks on the tops of the mountains on either side were often of very curious shapes, and the strata in places much contorted; there were also some magnificent cliffs, and the cascades of snow water falling down the narrow gullies added motion to the grandeur of the scene. The snow gradually decreased as we descended. On arriving at the spot where the valley joins another I found the Indians camped on a patch of prairie, where I was glad enough to let my horse free, as we had travelled this day from six to six, with a halt of only 1½ hours."

In 1859 Capt. Palliser crossed the Kootanie Pass and encountered a heavy snow storm on the 8th September at the height of land.

In 1858 Dr. Hector had severe weather on and about the 3rd September at Kicking Horse Pass. On the 8th September, when ascending the South Branch, near its head waters, the mountains on each side were covered with snow, those on the south side having their valleys covered with glaciers, some of great size. At the water-shed, 6,347 feet above the level of the sea, snow was lying under the shade of trees, notwithstanding the clear mid-day sun.

East of the mountains, in lat. $52^{\circ} 20' N.$, several inches of snow fell in the last week of September, and in the first week of October snow fell between Rocky Mountain House and Edmonton to the depth of 18 inches.

"Along the eastern base of the Rocky Mountains there is a narrow tract close to them where there are never more than a few inches of snow on the ground, and the rivers when rapid remain open during the winter. In consequence of this a few ducks are found to linger throughout the whole season in the mountains, while from the Plain Country, in latitudes much

farther south, they are necessarily absent from October till May. Forty miles east of the mountains the snow-fall is much increased, but during the depth of winter rarely exceeds two feet."*

"The weather experienced in the Rocky Mountains was very irregular, with a great daily range of temperature. Thus, in the end of August the thermometer during the night was as low as 14° at an altitude of 6000 feet, and almost every night it fell considerably below the freezing point, although during the day it often reached 70° to 80° . In the valleys of the eastern slope the amount of rain-fall is very small compared to that on the first part of the descent to the west, when fine weather is the rare exception even in September. This only applies, however, to the mountains north of the fifty-first parallel of latitude, south of which, for some reason, the rain-fall on the western slope in the valley of the Kootanie River must be much less, judging both from the experience of two seasons and from the nature of the vegetation, which is of the arid type.

"On the eastern slope, throughout the entire summer, there are occasional falls of snow at altitudes above 5000 feet; but snow never lies deeply at any season." It is only on the various 'heights of land' which have an altitude of from 6000 to 7000 feet, and for the first few miles of the western descent, that snow appears to accumulate in the valleys in large quantities—sometimes to the depth of 16 to 20 feet."

* Dr. Hector on the Physical Features of the central part of British North America. Edin. New Phil. Journal.

THE CANOE ROUTE TO RED RIVER.

The project of a direct line of communication between Canada and the valley of the Saskatchewan, entirely through British territory, engaged the attention of the Canadian government during the years 1857-8 and 9. Since that period the question has been allowed to remain in abeyance, and no steps have been taken to open any one of the different routes explored, or to encourage private enterprise in this important undertaking. The inactivity of the Canadian government has no doubt arisen in great part from the undefined position and status of the proposed new Colony between Canada and British Columbia. The Imperial government have not yet taken any steps to organize the valley of the Saskatchewan into a separate Colony, and it still remains under the jurisdiction of the Hudson Bay Company.

The extraordinary discoveries of gold in British Columbia, must soon lead to the adoption of some form of government for the people inhabiting the valley of the Saskatchewan, as well as to the opening of a direct line of communication across the continent through British Territory. Such a communication does in fact exist, but it is only capable of being used during the summer months, and at the best affords but a tedious and expensive mode of travelling through the wilderness which separates Lake Superior from Red River. The expenditure of a comparatively small sum of money, when the great object in view is taken into consideration, would enable the communication to be made with ease and expedition, and the works would be a necessary preliminary to a general route capable of being used throughout the year.

At present this communication is only available during the season of navigation, but there are many important facts which are daily coming to light respecting the north shores of Lakes Huron and Superior, and many developments taking place which will render the winter communications through these apparently inhospitable wastes a commercial necessity, before many years have passed away.

There are three canoe routes which have been surveyed between Lake Superior and Rainy Lake. The first is the old Nor-West Company's route, *via* Pigeon River, and the boundary line between the United States and Canada. The second is the Kaministiquia route, *via* the Savanne Portage, Milles Lacs and Sturgeon Lake, followed by the Hudson's Bay Company. The third is the one surveyed by Mr. Simon Dawson, *via* Dog Lake, the Savanne Portage, Milles Lacs, and the River Seine to Rainy Lake.

In view of a permanent communication across the continent, to be constructed entirely through British territory, the Pigeon River route is open to the objection, that it lies on the boundary line, an objection which at the juncture will be considered insuperable. The Seine route is shorter and no doubt superior to that by Sturgeon Lake, it also possesses the great advantage that it is not only removed some distance from the boundary line, but it lies in the direction of a land communication north of the deep indents of Rainy Lake, which will be ultimately adopted, if a land route, entirely through British territory, available at all seasons of the year, should be constructed.

The idea of a land communication between Canada and Red

River, passing altogether through Canadian territory, is far from being so visionary as it is the fashion to represent; as before stated, events of singular importance are fast hastening the establishment of the route. The north shore of Lake Huron is attracting settlers, the north shore of Lake Superior is known to possess immense mineral wealth, and there is every probability that in view of the national importance of a route across the continent, in consequence of the amazing gold wealth of British Columbia, the auriferous character of the Eastern Slope of the Rocky Mountains, and the remarkable fertility of forty million acres in the valley of the Saskatchewan, a BRITISH AMERICAN OVERLAND ROUTE, open throughout the year, will be an established fact within the next ten years. This route will not necessarily approach, except in certain points the north shores of Lakes Huron and Superior, and it will ultimately turn to the north of the deep indents of Rainy Lake, cross the Winnipeg at or near Rat Portage, and not approach the boundary line within thirty miles.

Some portion of the summer canoe route, *via* the River Seine, will probably form part of this great line of communication, and I shall therefore introduce an abstract of Mr. Simon Dawson's suggestions in a brief description of the Canoe Routes to Red River.

The Hudson Bay Company's route, *via* the Fort William and the Kamministiquia, has been so fully described in the reports of the Canadian Red River expedition that a detailed notice is here unnecessary. Since 1857, various improvements have been made on the line of communication proposed [redacted] led the route, and practised canoe men are indispensable in

by Mr. Dawson as far as the Savanne Portage, which render it the most desirable route to be pursued. A guide, however, would be absolutely necessary for any party wishing to travel with expedition, as the beginning of the different portages are by no means easily discovered by those who have not travelled many of the rapids, the alternative involving a portage round them, which would greatly increase the time occupied in making the voyage. Assuming that canoes, guides, and good canoe men could be procured without delay at Fort William, according to the number of the party, the question of provisions is the most serious item. There would be small chance of any supplies being obtained on the route, and the exertion required induces extraordinary appetites, which must to a certain extent be satisfied or the severe labour involved can not be long endured. A pound and a half of pork and a pound of flour per man per diem, with a plentiful supply of tea is the least which would be required. A north canoe can accommodate nine persons, and the voyage would take twenty days by the Winnipeg, and 450 lbs. of provisions would be required as the minimum it would be safe to embark with. Smaller canoes carrying four or six persons are more convenient than north canoes, but there would be always a difficulty in the present state of affairs in procuring canoes and men for a large party, without steps were taken some weeks in advance of the opening of navigation.

Mr. Dawson's plan, it will be seen, contemplated a complete organization of boats, waggons and steamers, besides the daming of rivers, the opening of roads, and the establishment of provision stores on the line of route.

By opening the communication in the way proposed by Mr. Dawson, the total distance from Lake Superior to Red River Settlement, by land and water, would be as follows:

	Land carriage, miles.	Navigable miles.
From Thunder Bay to Dog Lake.....	28	
Through Dog Lake and River to the Prairie Portage.		35
Land road past Prairie and Savanne Portages to Savanne River.....	5	
Through Savanne River, Lac des Mille Lacs and the River Seine to the Little Falls	65	
Broken navigation on River Seine		59½
Land carriage past the twelve portages on River Seine	7	
From the Seine to the western extremity of Lac Plat, navigable with only one break at Fort Francis.....		208
Thence to Fort Garry by land	91½	
 Total	131½	367½

"Waggons or carts would be required on the road between Thunder Bay and Dog Lake.

"On Dog Lake and River, boats such as are used by the Hudson's Bay Company, or even a steamer might be employed.

"At the Prairie Portage, carts or waggons would be necessary.

"On the Savanne River, Lac des Mille Lacs, and the River Seine as far as the Little Falls, after a dam was constructed at the last mentioned place, there would be an unbroken reach of 65 miles, and on this section it would be advantageous to have a small steamer.

"On the 59½ miles of broken navigation, on the River Seine, between the Little Falls and the Twelve Portages, boats should be used, while at the land road past the twelve portages, carts or waggons, as on the other sections of road, would be necessary.

"From the River Seine to Fort Frances a steamer would have a clear run of fifty miles.

"From Fort Frances to Lac Plat, steamers would have an uninterrupted run of 158 miles.

From the latter place to Fort Garry no provision would have to be made, as the means of transport are to be had in abundance at the Red River Settlement."*

* For full particulars respecting the various routes from Lake Superior to Red River, see the "Reports of the Red River Expedition for 1857 and 1858.

In the present state of affairs it is not advisable for any party desirous of crossing the continent to the gold fields of British Columbia, to attempt the Canoe Route. The road by St. Paul is more expeditious, less expensive, and would admit of the necessary supplies being procured without loss of time, and far cheaper than they could be conveyed in canoes or obtained at Red River Settlement.

PROJECT OF A ROUTE ACROSS THE CONTINENT ENTIRELY THROUGH BRITISH TERRITORY.

The region north of Lakes Huron and Superior has hitherto been the great bugbear in the way of a land route across British America. Several important changes have taken place during the last few years in the government arrangements for the exploration and colonization of this vast area of country, which will ultimately lead to the establishment of a great inland line of communication, following in the first instance the Colonization Roads stretching from the settled parts of Canada towards Lake Nipissing, and thence to Sault St. Marie. In order to afford greater facilities for those who are disposed to take advantage of the vast mineral wealth of the North Shores, the government, by an order in Council, dated March 15, 1860, adopted the following important Regulations :

“That for mining purposes, tracts comprising not more than

also the “Reports of the Assiniboine and Saskatchewan Expedition,” and “A Narrative of the Canadian Red River Exploring Expedition of 1857, and of the Assiniboine and Saskatchewan Exploring Expedition of 1858,” by the Author; Longman & Co: London, 1860.

four hundred acres each be granted to parties applying for the same, at the rate of one dollar per acre, to be paid in full on the sale, the applicant furnishing a plan and description of the locality to the Crown Lands Department, and on condition that such mineral location be worked within one year from the date of the grant.

"The patent to issue two years from date of sale; the fee for permission to explore is abolished, and the locations are to be sold to the first applicant agreeing to the conditions. These regulations do not apply to 'mines of gold or silver.'

It is also proposed to block out into Townships the whole of the mining region on Lakes Huron and Superior, opening well the exterior lines of the townships. The facilities for exploration will no doubt induce great additional efforts to develope the mineral wealth of that country, and the opening of a road at the rear of the townships will be the commencement of a great line of communication connecting the whole of the north shores of these inland seas with the Colonization Roads between the Ottawa and Lake Huron. A surveying party has already been for more than a year engaged in exploring and surveying the shores of Lake Superior and the country in the rear, to the depth of about twenty five miles. The Colonization Roads are rapidly penetrating the wilderness, and one of them, the Bâbcaygeon Road, already extends to Lake Nipissing, and the tract through which it passes is found to contain much good land fit for settlement. The great Northern Road, extending from Goulaïs' Bay, easterly, to Spanish River, is already located and part of it constructed. The completion will provide a means

for both winter and summer communication by land between the eastern portions of Canada and the rapidly advancing settlements around the Sault St. Marie. The price of lands within the limits of the territory of the Free Port at Sault St. Marie, has been reduced to 20 cents an acre, a step which will probably induce a large influx of emigrants adapted to the industry of mines, forests, and fisheries.

The difference between the American side of Superior and the north or Canadian side, is remarkably shown in the following tables, although the opinion is general among "prospectors" that the mineral wealth on the north side is very great, and the geological survey, which was confined to the coast and principal rivers, indicates an extensive metaliferous area.

In the Spring of 1860 the white population on the north shore of Lake Superior, exclusive of the Hudson Bay's Company's Posts, was nine; at the same time that of the American side was 19,695. The Canadian vessels engaged in trade were two steamers and two schooners. On the American side there were six side-wheel steamers, ten propellers, one small steamer between Superior City and Bayfield, nine steamers and steam-ferry-boats on Portage Lake, four steam tugs between White Fish Pond and Detour Channel, upwards of one hundred first-class schooners, and two revenue cutters. The trade through the Sault Ste. Marie Canal amounted in 1859 to—

Exports from Lake Superior	\$3,071,069
Imports, &c.	5,228,640
Passengers.....	11,543

The American mines are not on the coast, the nearest being $2\frac{1}{2}$ miles distant, the greater number 12 to 14 miles from the waters of the lake. The "ancient mines of Lake Superior" have been found on the north shore, at Mamanise and on the Island of St. Ignace. On the American side, deep and narrow depressions, the remains of the works of the ancient miners are numerous, and vast numbers of native green-stone hammers, from 5 pounds to 39 pounds in weight, are constantly dug up in these depressions, besides copper chisels, sleepers of oak, charcoal, spear-heads and knives of copper. On the Canadian shore of Lake Huron, the success of the proprietors of the Wellington Mine is very encouraging. The dividend for 1859 being £6,350, the capital invested £20,000. The new regulations established by the Canadian government in relation to mining locations throughout this extensive region, is already attracting the attention of Americans, and a rapid settlement of several very promising locations is more than probable. During the season of navigation the facilities for reaching any port of Lake Superior by steamer are such that a vessel from Liverpool, of a capacity fitted to go through the locks of the Welland Canal may discharge her cargo at Fort William or any port on this vast inland sea without breaking bulk. Hence, for a summer communication, say from May to November, the starting point of the Overland Route would be Fort William or some other port on Lake Superior.

The next step in the overland communication through British America, is from Lake Superior to the Settlements on Red River. The water parting is not more than 890 feet

above Lake Superior, and the country is thickly wooded with valuable trees, as far as the Lake of the Woods. There does not exist any difficulty in the construction of a road between Thunder Bay and the most easterly indent of Rainy Lake, a distance of 200 miles. Between Rainy Lake and the north-west angle of the Lake of the Woods the country in the rear of Rainy River, a distance of 120 miles, is unexplored, and its facilities for a direct land communication unknown. From the north-west corner to Fort Garry, 90 miles, is a level country which has already been travelled with horses, although the swamps near Lac Plat are formidable. The third step is the valley of the Saskatchewan, which even in its present state is constantly traversed with horses and carts from Red River to the Rocky Mountains, and contains not less than FORTY MILLION acres of excellent agricultural soil, which form a vast FERTILE BELT from the Lake of the Woods to the Rocky Mountains.

THE FERTILE BELT IN THE VALLEY OF THE SASKATCHEWAN.

The basin of Lake Winnipeg extends over twenty-eight degrees of longitude and ten degrees of latitude. The elevation of its eastern boundary, at the Prairie Portage, 104 miles west of Lake Superior, is 1,480 feet above the sea, and the height of land at the Vermillion Pass is less than 5,000 feet above the same level. The mean length of this great inland basin is about 920 English miles, and its mean breadth 380 miles, hence its area is approximately 360,000 square miles, or a little more than that of Canada.

Lake Winnipeg, at an altitude of 628 feet above the sea, occupies the lowest depression of this great inland basin, covering with its associated Lakes Manitobah, Winnepegosis, Dauphin, and St. Martin, an area slightly exceeding 13,000 square miles, or nearly half as much of the earth's surface as is occupied by Ireland.

The outlet of Lake Winnepeg is through the contracted and rocky channel of Nelson River, which flows into Hudson's Bay.

The country possessing a mean elevation of one hundred feet above lake Winnipeg is very closely represented by the outline of Pembina Mountain, forming part of the eastern limit of the Cretaceous Series in the north-west of America.

The area occupied by this low country, which includes a large part of the valley of Red River, the Assiniboine, and the main Saskatchewan, may be estimated at 70,000 square miles, of which nine-tenths are lakes, marsh, or surface rock of Silurian or Devonian age, and generally so thinly covered with soil as to be unfit for cultivation, except in small isolated areas.

Succeeding this low region there are the narrow terraces of the Pembina Mountain, which rise in abrupt steps, except in the valleys of the Assiniboine, Valley River, Swan River, and Red Deer's River, to the level of a higher plateau, whose eastern limit is formed by the precipitous escarpments of the Riding, Duck, and Porcupine Mountains, with the detached outliers, Turtle, Thunder, and Pasquia Mountains. This is the great PRAIRIE PLATEAU of Rupert's Land; it is

bounded towards the south-west and west, by the Grand Coteau de Missouri and the extension of the table land between the two branches of the Saskatchewan, which forms the eastern limits of the PLAINS of the north-west. The area of the Prairie Plateau, in the basin of Lake Winnipeg, is about 120,000 square miles; it possesses a mean elevation of 1,100 feet above the sea.

The plains rise gently as the Rocky Mountains are approached, and at their western limit have an altitude of 4000 feet above the sea level. With only a very narrow belt of intervening country, the mountains rise abruptly from the plains, and present lofty precipices that frown like battlements over the level country to the eastward.* The average altitude of the highest part of the Rocky Mountains is 12,000 (about lat. 51°) feet. The forest extends to the altitude of 7000 feet, or 2000 feet above the lowest pass.

The "FERTILE BELT" of arable soil, partly the form of rich, open prairie, partly covered with groves of aspen, which stretches from the Lake of the Woods to the foot of the Rocky Mountains, and is coloured yellow on the accompanying map, averages 80 to 100 miles in breadth. The North Saskatchewan flows through the Fertile Belt, in a valley varying from one-fourth of a mile to one mile in breadth, and excavated to the depth of 200 to 300 feet below the level of the prairie or plains, until it reaches the low country some miles east of Fort a la Corne. The area of this extraordinary belt of rich soil and pasturage is about forty millions acres. It was for-

* Dr. James Hector on the Physical features of the central part of British North America. Edin. Nat. Phil. Journal.

merly a wooded country, but by successive fires it has been partially cleared of its forest growth, but abounds with the most luxuriant herbage and generally possesses a deep and rich soil of vegetable mould. "This region in winter is not more severe than that experienced in Canada, and in the western districts, which are removed from the influence of the Great Lakes, the spring commences about a month earlier than on the shores of Lake Superior, which is five degrees of latitude further to the south. * * * * The depth of snow is never excessive, while in the richest tracts the natural pasture is so abundant, that horses and cattle may be left to obtain their own food during the greater part of the winter."*

The Fertile Belt of the Saskatchewan Valley does not derive its importance from the bare fact that it contains 64,000 square miles of country available for agricultural purposes in one continuous strip 800 miles long and on an average 80 broad, stretching across the continent; it is rather by contrast with an immense SUB-ARCTIC area to the north and DESERT area to the south that this favoured "Edge of the Woods" country acquires political and commercial importance. A broad agricultural region, capable of sustaining many millions of people and abundantly supplied with iron ore and an inferior variety of coal, and spanning the eight hundred miles which separate Lake Winnipeg from the Rocky Mountains, more than compensates for the rocky character of the timbered desert between the Lake of the Woods and Lake Superior.

* Dr. James Hector on the Capabilities for Settlement of the Central part of British North America.

Capt. Palliser thus describes the Fertile Belt:—"It is now a partially wooded country, abounding in lakes and rich natural pasturage, in some parts rivalling the finest park scenery of our own country. Throughout this region of country the climate seems to preserve the same character, although it passes through very different latitudes, its form being doubtless determined by the curves of the isothermal line. Its superficial extent embraces about 65,000 square miles, of which more than one-third might be considered as at once available for the purposes of the agriculturist." The "Great American Desert," which stretches from the south branch of the Saskatchewan to the Gulf of Mexico, is altogether uncultivable not only from aridity of climate but from sterility of soil.

The physical geography of the arid region in the United States has been very admirably described by Dr. Joseph Henry.*

* Meteorology in its connection with Agriculture, by Professor Joseph Henry, Secretary of the Smithsonian Institute.

"The general character of the soil between the Mississippi River and the Atlantic is that of great fertility, and as a whole, in its natural condition, with some exceptions at the west, is well supplied with timber. The portion also on the western side of the Mississippi, as far as the 98th meridian, including the States of Texas, Louisiana, Arkansas, Missouri, Iowa, and Minnesota, and portions of the territory of Kansas and Nebraska, are fertile, though abounding in prairies, and subject occasionally to droughts. But the whole space to the west, between the 98th meridian and the Rocky Mountains, denominated the Great American Plains, is a barren waste, over which the eye may roam to the extent of the visible horizon with scarcely an object to break the monotony.

"From the Rocky Mountains to the Pacific, with the exception of the rich but narrow belt along the ocean, the country may also be considered, in comparison with other portions of the United States, a wilderness unfitted for the uses of the husbandman; although in some of the mountain valleys, as at

Major Emery, of the United States and Mexico Boundary Commission, says :—

"The term 'plains' is applied to the extensive inclined surface reaching from the base of the Rocky Mountains to the shores of the Gulf of Mexico and the valley of the Mississippi, and from a feature in the geography of the western country as notable as any other. Except on the borders of the streams which traverse the plains in their course to the valley of the Mississippi, scarcely anything exists deserving the name of vegetation. The soil is composed of disintegrated rocks, covered by a loam an inch or two in thickness, which is composed of the exuviae of animals and decayed vegetable matter.

"The growth on them is principally a short but nutritious grass, called buffalo grass (*Sysleria dactyloides*). A narrow strip of alluvial soil, supporting a coarse grass and a few cotton-wood trees, marks the line of the water-courses, which are themselves sufficiently few and far between.

"Whatever may be said to the contrary, these plains west of the 100th meridian are wholly unsusceptible of sustaining an agricultural population, until you reach sufficiently far south to encounter the rains from the tropics."

Salt Lake, by means of irrigation, a precarious supply of food may be obtained sufficient to sustain a considerable population, provided they can be induced to submit to privations from which American citizens generally would shrink. The portions of the mountain system further south are equally inhospitable, though they have been represented to be of a different character. In traversing this region, whole days are frequently passed without meeting a rivulet or spring of water to slake the thirst of the weary traveller."

"We have stated that the entire region west of the 98th degree of west longitude, with the exception of a small portion of western Texas and the narrow border along the Pacific, is a country of comparatively little value to the agriculturist; and, perhaps, it will astonish the reader if we direct his attention to the fact that this line, which passes southward from Lake Winnipeg to the Gulf of Mexico, will divide the whole surface of the United States into two nearly equal parts. This statement, when fully appreciated, will serve to dissipate some dreams which have been considered as realities as to the destiny of the western part of the North American continent. Truth, however, transcends even the laudable feelings of pride of country; and, in order properly to direct the policy of this great confederacy, it is necessary to be well acquainted with the theatre on which its future history is to be enacted and by whose character it will mainly be shaped."

The opinion of Mons. Bourgeau, who was appointed by Sir William Hooker to accompany Capt. Palliser's expedition as Botanist, is of the highest value: it assigns to the prairies of the Saskatchewan their proper agricultural position without reference to political advantages or the all absorbing gold region of British Columbia.

MEMORANDUM BY MR. BOURGEAU.

"I submit the following remarks on the advantages for agricultural settlement in Rupert's Land and the Saskatchewan prairies of British North America, having been appointed by Sir William Hooker to accompany Captain Palliser's Expedition as botanist.

"I had especially to collect the plants that grew naturally in the country traversed by the Expedition, and also their seeds. Besides my botanical collection, Dr. Hooker advised me to make thermometrical observations at the various stations, and, above all things, to take the temperature of the earth at certain depths, as well as that of the interior of forest trees; also to notice the richness and poverty of the vegetation of the country, and the maladies to which plants are exposed. In the second letter and notes addressed to Sir William Hooker, which have already been published,* I have treated these questions with all the care that was permitted to me by observations taken in the midst of the harassment and fatigue of a long journey, but it remains for me to call attention to the advantages there would be in establishing agricultural settlements in the vast plains of Rupert's Land,

* Lin. Soc. Proceedings. 1859.

and particularly on the Saskatchewan in the neighbourhood of Fort Carlton. This district is much more adapted to the culture of staple crops of temperate climates—such as wheat, rye, barley, oats, &c.—than one would have been inclined to believe from its high latitude. In effect, the few attempts at the culture of cereals already made in the vicinity of the Hudson's Bay Company's trading posts, demonstrate by their success how easy it would be to obtain products sufficiently abundant largely to remunerate the efforts of the agriculturist. There, in order to put the land under cultivation, it would be necessary only to till the better portions of the soil. The prairies offer natural pasturage as favourable for the maintenance of numerous herds as if they had been artificially created. The construction of houses for habitations by the pioneers in the development of the country would be easy, because in many parts of the country, independent of wood, one would find fitting stones for building purposes; and in others it would be easy to find clay for bricks, more particularly near Battle River. The other parts most favourable for culture would be in the neighbourhood of Fort Edmonton, and also along the south side of the North Saskatchewan. In the latter district extend rich and vast prairies, interspersed with woods and forests, and where thick wood plants furnish excellent pasturage for domestic animals. The vetches found here, of which the principal are *Vicia*, *Hedysarum*, *Lathyrus*, and *Astragalus*, are as fitting for the nourishment of cattle as the clover of European pasturage. The abundance of buffalo, and the facility with which the herds of horses and oxen increase, demonstrate that it would be enough to shelter animals

in winter, and to feed them in the shelters with hay collected in advance, in order to avoid the mortality that would result from cold and from the attacks of wild beasts, and further to permit the acclimatising of other domestic farmyard animals, such as the sheep and pig. The harvest could in general be commenced by the end of August, or the first week in September, which is a season when the temperature continues sufficiently high and rain is rare. In the gardens of the Hudson's Bay Company's Posts, and still more in those of the different Missions, vegetables of the leguminous family, such as beans, peas, and French beans, have been successfully cultivated; also potatoes, cabbages, turnips, carrots, rhubarb, and currants. No fruit tree has as yet been introduced; but one might perhaps, under favorable circumstances, try nut-trees, also apple-trees belonging to varieties that ripen early. Different species of gooseberries, with edible fruits, grow wild here; also different kinds of *Vacciniacæ* are equally indigenous, and have pleasant fruits that will serve for the preparation of preserves and confectionary. The *Aronia ovalis*. (*Amelanchier canadensis* must be meant) is very common in this country; and its fruit, commonly known as the *Poire*, or service-berry, is dried and eaten by the Indians, who collect it with great care; and it also serves for the purpose of making excellent pudding, recalling the taste of dried currants. The only difficulty that would oppose agricultural settlements is the immense distance to traverse over countries devoid of roads, and almost uninhabited. The assistance of government or of a well-organised company, would be indispensable to the colonization of this country. It would be important that

settlements should be established in groups of at least fifty householders, for protection against the incursions of the Indians, who are, however, far from being hostile to Europeans. It stands to reason, that the colonists ought to be taken from the north of Europe or from mountain districts, being those accustomed to the climatological conditions and culture of the soil most resembling this interesting country, to the resources of which I call attention. The produce of agricultural settlements thus established would yield subsistence to the Indians, whose resources for food, supplied only by hunting, tend to diminish every day. The presence of European settlers would form a useful model for this primitive people, who, notwithstanding their native apathy, still appreciate the benefits of civilization."

(Signed)

"E. BOURGEAU."

Dr. Hector says of the Fertile Belt:—

"The most valuable feature of this belt of country, which also stretches from Touchwood Hills, Carlton, and Fort Pitt south of Fort Edmonton to the old Bow Fort at the Rocky Mountains, is the immense extent it affords of what I shall term winter pasturage.

"This winter pasturage consists of tracts of country partially wooded with poplar and willow clumps and bearing a most luxuriant growth of vetches and luxuriant grasses. The clumps of wood afford shelter to animals, while the scrubby brush keeps the snow in such a loose state that they find no difficulty in feeding; the large tracts of swampy country, when frozen, also form admirable feeding grounds; and it is only towards spring, in very severe winters, that cattle and horses cannot be left to feed in well-chosen localities throughout this region of country.

"The proportion of arable land is also very considerable, and even late in autumn, which is the driest period of the year, and when the Saskatchewan for some weeks is fordable at Edmonton, there seems to be no want of water in the form of small streams and lakes. In spring I found the snow deeper in the neighbourhood of Fort Pitt than at Edmonton."

Very incorrect ideas have been formed respecting the fitness of the prairies of the Fertile Belt for the immediate construction of a railway, as merely involving the laying of rails and the bridging of rivers. The really level prairies cease after passing Prairie Portage on the Assiniboine, 90 miles from Fort Garry. The country then becomes undulating and often intersected by deep gullies or ravines, forming the narrow valleys in which rivers and brooks flow from 100 to 300 feet below the prairie level. These physical peculiarities present formidable obstacles in a pecuniary point of view to the construction of a railroad where timber for constructive purposes is scarce, and building material of any description not easily accessible west of the great lakes.

A post road as a preliminary to a railway could be established without difficulty or considerable expense. Indeed there are only two or three points which would require more than the labour of a few men between Red River and Carlton. But it would be necessary to have a ferry on some of the rivers, and particularly on the Qu'Appelle, and one on the South Branch of the Saskatchewan.

It would not be doing justice to the noble river which drains the Fertile Belt if no allusion were made to its fitness for steam navigation. This has been generally assumed to be the case, but without sufficient grounds.

THE SASKATCHEWAN ROUTE.

It is sometimes recommended by persons who have not experienced the difficulties of the route, that Lake Winnipeg and the Saskatchewan afford an easy means of traversing a large

part of the country between Red River and the Rocky Mountains. There can be no doubt whatever that if a party were coming FROM BRITISH COLUMBIA TO CANADA THE SOUTH BRANCH OF THE SASKATCHEWAN, THE QU'APPELLE, AND THE ASSINIBOINE WOULD OFFER A MOST DESIRABLE AND FACILE ROUTE, but going west against the current, the journey is tedious, harrassing, and fatiguing. The boats which long experience has proved to be the best adapted for the navigation of the rivers of the North-west, are very strongly built, but they are subjected to severe strains and much rough usage in crossing the portages. A boat for the voyage through Lake Winnipeg and up the North or South Branch of the Saskatchewan, need not be nearly so heavy as the Hudson Bay Company's barges, and if provided with a slip keel, great progress might frequently be made by sailing in the lake and up many reaches of the Saskatchewan. With the present kind of boats in use the whole ascent of this great and rapid river involves much labour and fatigue. The current is so swift, as its name implies, that the voyageurs are compelled to track wherever there is footing on the banks. The same objection holds good with regard to the South Branch, the current is very swift, from $2\frac{1}{2}$ to 6 miles an hour, so that the ascent of either branch in boats or canoes, without the aid of steam power, is not to be recommended to any party desirous of reaching the Rocky Mountains in one season. The obstacles which are encountered in the way of rapids, portages, shallows and mud banks, will now be described in considering the capabilities of the Saskatchewan for steamboat communication.

From one of the mouths of Red River, where there is 18 feet of water in the channel; and from 4 to 6 feet on the bar, there is no obstacle to a continuous navigation for a steamer as far as the Grand Rapids at the mouth of the Saskatchewan.

A steamer drawing when light 18 inches of water might, it is thought by many, be warped up the Grand Rapid with the assistance of the power it could supply, but in all cases it would be necessary, until a canal about three miles long, with four locks of 12 feet lift were constructed, to have a tramway round this formidable impediment.* There are two other rapids, four and five miles respectively, above the Grand Rapid. The length of the first is one mile—it is a long and gradual slope, with a fall of $7\frac{1}{2}$ feet, and a broad channel of deep water in the middle. Loaded boats of 4 or 5 tons are tracked up this without difficulty. The next rapid is 10 chains long, with a fall of $2\frac{1}{2}$ feet. These rapids would not present any difficulty to a steamer. All the impediments above the Grand Rapids might be avoided by taking the route through the little Saskatchewan and St. Martin's Lake to Lake Manitobah, thence through Water-Hen River and Winnipegoosis Lake to the Mossy Portage,† which is four miles in length. Lake Winnipegoosis is only four feet above Cedar

* The Grand Rapid, four miles from the mouth of the Saskatchewan, is 2 miles and 56 chains long. The total fall is 44 feet. The Hudson Bay Company's boats run this rapid with full cargo. In ascending they are tracked from the foot of the rapid to the east end of the portage with half cargo, they are then run back again empty, and again tracked up with the other half. From the east to the west end of the portage, boats are traced up *via* the south side of the rapid with a load of 1,300 lbs. The remainder of the load is generally carried over the portage.

† For a description of this route see Mr. Dawson's Report for 1858.

Lake, through inlands. The Saskatchewan flows at this point westward to Thobon's Rapids, 180 miles from Cedar Lake. There is no impediment to a steamer drawing two feet water beyond mud banks and shallows, which can always be avoided by a good pilot.

Captain Blakiston, who went up the Saskatchewan in 1857 at a period of low water, states that Thobon's Rapid is certainly not navigable for a steamer in low water, and he doubts whether it would be when the river is high, "but the difference caused by the state of the water in a rapid is so great that it is hardly safe to give an opinion." It will be borne in mind that powerful steamers can be constructed to draw, when loaded, no more than two feet of water, it is therefore very probable that this rapid would not present any serious impediment even at low water which might not be removed at small expense, or avoided by the construction of a wing.

From Thobon's Rapids to the Grand Forks there is no impediment whatever which a good pilot might not avoid. The "Coal Falls," on the North Branch, are formidable, and would require to be cleared of some immense boulders which obstruct the passage. The current is from 5 to 7 miles an hour, and the channel in its present condition very intricate, and in low water probably unnavigable. Captain Blakiston expresses his opinion respecting the navigation of the Saskatchewan above the Coal Falls in the following terms.

"From the head of these rapids the bed of the river is filled with batteurs or sand bars as far as the mouth of Vermillion Creek, about 25 miles above Fort Pitt, after which the bottom is usually of a strong nature, which continues to Fort

Edmonton, some distance below which there are small rapids and shoal places in the full of the year. Of the distance to which a steamer would ascend in high water I can give no positive information, but I should suppose that one adapted for that kind of navigation might possibly reach Fort Edmonton, but in low water little could be accomplished in most parts."

The South Branch, about 150 miles from its junction with the North Branch, is much obstructed with shoals and sand bars, but in descending it from the Elbow in August, 1858, I found then no impediments which would obstruct the passage of a steamer of shallow draft. The same remark may in all probability be applied to this branch as far as the mouth of Red Deer River.

When travelling from the Rocky Mountains to Red River the North and South Branches of the Saskatchewan will be most advantageously used. A boat or canoe can drift down these swift currents at the rate of 50 or 60 miles during a long summer day, and the voyage from the Old Bow Fort might be made with great rapidity and ease down Bow River and the South Saskatchewan to the Elbow or mouth of the "River that Turns." A portage of twelve miles involving an ascent of 80 feet would then have to be made to the sources of the Qu'Appelle, down which stream the traveller can float to the Assiniboine at Fort Ellice, and thence to the Red River Settlements. Indians and Half-breeds not unfrequently make long journeys down the South Branch in canoes made from buffalo hides, which are called "Bull-boats." I have no doubt that the distance between Old Bow Fort and Fort Garry,

about 900 miles, might be accomplished in 20 days in a small canoe or skiff, *via* the South Branch, Qu'Appelle, and Assiniboine, except during a very dry season.

A SKETCH OF THE GEOLOGY OF THE ROCKY MOUNTAINS.*

The Rocky Mountains rise suddenly from the great prairie plains of the Saskatchewan Valley. These sometimes present cliffs 2,000 to 3,000 feet in height. They are formed of broken folds or plications of strata, and are disposed in parallel groups, the great valleys in the length of the chain occupying fractures or huge cracks in the summit of the folds. These wide valleys are more or less connected by deep narrow defiles; so that the river flowing through the valley either north or south makes short breaks through the connecting defiles to the east or west, and the courses of the rivers in the mountains are consequently zig-zag. Proceeding westward from Bow Fort the first range of mountains is composed of carboniferous strata, so also is the second range, the valley between them being occupied by mesozoic strata. The valley between the second and third range shows rocks of Devonian age, while the central range consists of quartzites and conglomerates, probably Silurian, which rests on Talcose Slates with QUARTZ VEINS. The occurrence of quartz veins is important, as will be shown hereafter. In crossing the moun-

* The reader is referred to No. 68 of the *Quarterly Journal of the Geological Society* for a description of the geology of the Rocky Mountains in British America, by Dr. Hector. The sketch in the text is a summary of part of Dr. Hector's paper.

tains from Bow River the traveller passes successively over the upturned edges of the great fossiliferous central basin of North America, and the rocks occur in correct sequence from the first range to the central.

The section along the North Saskatchewan within the mountains shows the following sequence of rocks:—

1. Brazeau Range, Mesozoic strata resting on Carboniferous.
2. Sheep River, " " " "
3. First range of mountains, Carboniferous, much folded, and followed by Devonian rocks on west flank.
4. Valley, Mesozoic strata.
5. Second range, Carboniferous resting on Devonian, and the Devonian on Silurian. (?)

Section on the west slope of the mountains,

1. Height of land, Carboniferous strata.
2. Blueberry Pass, Carboniferous resting on Silurian. (?)
3. Columbia Valley, east side, Carboniferous resting on highly tilted Schists.
4. West side of Columbia Valley, Schists.
5. Kootanie Mountains, Schists.
6. Paddler Lakes, Granite.

The carboniferous rocks consist of thick bedded limestones of a dark and light blue colour, crystalline, compact, or cherty. They are associated with beds of gritty, sandy shale generally of a dull red or purple colour.

In the valley of Vermillion River, and also of Blueberry River, talcose shales occur, forming the floor of the valley. The Columbia Valley, known to be auriferous, is excavated in these shales.

TERRACES IN THE MOUNTAINS.

At the distance of 90 miles from the Rocky Mountains the valleys of the river flowing to the east commence to exhibit

terraces composed of rounded fragments of quartzite and limestone, such as would form the rounded shingle on a rocky shore. On approaching the mountains the terrace deposits spread out, and at last cover the whole country along the base of the mountains, filling up the hollows and valleys to the depth of several hundred feet.

In the mountains the terraces on the North Saskatchewan are remarkably developed, so also on Bow River and on the Athabasca River. If the drift of this valley should prove to be auriferous, as is stated, the base of the Sand-Dunes might be prospected for fine gold with favourable chances of success.

The terraces on the western slope are very important. It is from these great natural auriferous deposits that the precious metal will be procured in the greatest abundance at the commencement of mining operations in the country. They occur in the lower part of the Vermillion River, where they are formed of the same glistening white calcareous mud, that is found in the valley of the North Saskatchewan.

In the wide valleys of the Kootanie and the Columbia rivers these terraces are best developed on the Rocky Mountains.

The examination of the base of these terraces, and in localities similar to those indicated on the next page, should be prosecuted carefully in search for the precious metal. The importance of the terraces as Gold fields may be inferred from the following extract from Dr. Hector's paper:—

"TERRACES IN CALIFORNIA.—Before leaving these shingle-deposits, which are so largely distributed throughout the mountain-valleys of British North America, I may mention that in California I found these terraces ranging on the western slope of the Sierra Nevada, at least to the height of 3,000 feet, and there they are extensively worked by the

hydraulic method for the sake of the gold they contain. At Nevada City, and also on the Yuba River, I saw deposits of this shingle-conglomerate, 200 and 300 feet in thickness, actually being washed off from the face of the country by this powerful means, which consists in delivering water under great pressure against the face of the cliff, from nozzles like those of a fire engine. The supply of water for this purpose is in the hands of companies separate from those that conduct the mining, as it is often brought through tunnels and over high-level aqueducts from remote and uninhabited regions. The particles of gold are disseminated throughout the whole deposit, but the richest washings are from its base, where a pink pipe-clay, technically known as "pay-dirt," rests on the "bed-rock." The whole water, with the material washed out of the cliff, is directed through long troughs called "flumes," which are constructed of wood, like mill-leads, often continuously for six or seven miles. The large stones are thrown out, as they pass, by men with shovels, to save the wear on the bottom of the "flume," while the finer material is carried on by the rush of water, and passes over frequent cross bars called "ripples," where a little mercury is placed to entrap the gold by amalgamation. At Nevada City, where the coating of shingle deposit has thus been cleared from the surface of the coarse-grained and soft granite which underlies it, gigantic masses were exposed on what had once been the rugged shore of an inlet, just as may be seen on a waterworn coast of the same material at the present day. In California fragments of wood are found throughout the shingle in abundance, often carbonized, but in general silicified into a substance exactly resembling asbestos. In the sand and conglomerate of the Kootanie Valley I found fragments of wood of similar appearance.

"As my observations in California should not properly be introduced in this paper, I shall leave them for another opportunity, the object of my having mentioned them being to point out the great similarity between the superficial deposits of the great gold-country and those within the British territory further north, which encourages me to assert that the whole country up to the Kootanie River and the base of the Rocky Mountains, wherever the ancient terraces prevail resting on Silurian or metamorphic rocks, will be found to be auriferous. In my party in 1859 I had an expert "washer" who had been at the Californian mines, and he frequently got "colour," as a faint trace of gold is termed, by merely washing the gravel from the beds of the streams, without any regular "prospecting" or "digging." The discovery of what are among the richest "pan-diggings" on the Pacific coast in the Schimilcomeen Valley, and the existence of gold-mines worked since 1855 on Clark's Fork, half a mile north of the boundary-line where it meets the Columbian River, prove that the belt of auriferous country in California and

Oregon is continuous with that of Fraser River; and there is no reason to doubt that in a short time the rugged and unexplored country which forms a triangular region north of the boundary-line, and is drained by the waters of the Upper Columbia and the Kootanie Rivers, will be overrun by prospectors, and then by active gold-miners, just as the western part of British Columbia has been within the last few years."*

BRITISH COLUMBIA.

The country between the Rocky Mountains and the Pacific Ocean is rugged in the extreme. It forms a great trough, bounded to the west by the Cascade range of mountains, which closely hugs the Pacific coast. The Cascade range is only rarely broken by valleys, and it stands like a huge barrier wall 4,000 to 5,000 feet above the ocean. At intervals there occur great conical mountains, which rise to 10,000 or 12,000 feet, and from their isolation they present a very grand appearance.†

The correspondent of the *London Times*, under date of Nov. 29, 1861, gives the following information respecting the Cariboo Gold Fields:—

CARIBOO.

"The portion of British Columbia which has yielded nearly all the gold produced this year, and which is destined to attract the notice of the world to a degree hitherto not accorded to the country in the aggregate, is a newly discovered district called Cariboo (a corruption of 'Cerfboeuf,' a large species of reindeer which inhabits the country). The district is about 500 miles in the interior, north (or north-east

* "I have just heard that some Americans have discovered that there is gold deposited by the Saskatchewan at the Rocky Mountain House. If so, it must be washed out of the shingle-terraces along the eastern base of the mountains.—August 1, 1861."—Dr. HECTOR.

† Dr. Hector "On the Geology of a portion of North America." *Quar. Jour. Geo. Soc.*

rather) from the coast of British Columbia and the mouth of Fraser River. It is not far from the sources or 'head waters' of the south branch of Fraser River and the Rocky Mountains, and forms a patch of country—a broken, rugged mass of mountains and streams, 50 miles from north to south, and 30 miles from east to west, as far as yet known from recent exploration—round three sides of which the south branch of the Fraser makes a great bend or semicircle from its source to its junction with the north branch, near Fort George, a trading station of the Hudson's Bay Company, in about lat. $53^{\circ} 56'$ N. For the sake of accuracy, I should mention that this branch of the Fraser, although now popularly called the south branch (and which the Hudson's Bay Company called the north branch from the northerly direction of the first portion of its course), is really the main body of the river. Its sources are at a distance of some 60 or 70 miles westwardly from the main chain of the Rocky Mountains. The bend of the river, which embraces the new mineral region within its curve, runs a course north west 180 miles and then takes a south-west course of about 50 miles in length. This large section of country is believed, from the appearances presented on various parts of the surface, to be auriferous, both in quartz (gold matrix) and in placeres, throughout its whole extent; and the portions hitherto 'prospected' (as the miners' phrase is for the search for, and for the discovery of gold) are confined to the dimensions given above—50 by 30 miles.

"Fraser River does not acquire its great velocity in this part of its course, which runs through a comparatively level country until it enters the regions of the Cascades and other mountains through which its waters rush with an impetuosity which causes many obstructions to navigation. Consequently the river is navigable to Fort Alexander, in lat. $52^{\circ} 37'$ north for steamers of light draught of water, say three to four feet, up to Swift River, a distance of 45 miles, and which is within 40 miles of Antler, in Cariboo—a fact which will facilitate the traffic of next year by shortening the land carriage of the present route. Cariboo is in New Caledonia, as known in the division of districts west of the Rocky Mountains, by the Hudson's Bay Company, when they held the license of trade with the Indians in the country which now forms the colony of British Columbia. I cannot state the geographical position of Cariboo with accuracy, but the centre of that portion of the district which was the scene of this season's mining may be taken as lying between the sources of Antler Creek, Swift (or Cottonwood) River, and Swamp River, all of which flow and run in opposite directions, from a chain of mountains called "The Bald Mountains," traversing the district. This central point (by a correction of Arrowsmith's map) is in north lat. $58^{\circ} 20'$, west long. $121^{\circ} 40'$."

THE CLIMATE.

"We had from the first discovery of this gold district heard most unfavourable reports of the severity of the winter season, which was said to render the country uninhabitable. The matter was set at rest by some Canadians who wintered in Caribbo last year. They found the intensity of the cold so much less than in the Canadas, that they represented the climate as mild compared with that of their native country. It is inhospitable from the altitude and the abundance of mountains, the level land being about 3,000 feet and the mountains 5,000 feet more above the level of the sea. The spring is wet, and the summer subject to frequent rains. The snow falls in October; and, when the winter is fairly set in, the weather continues cold, clear and dry. The mining season continues from May to October at present: but when accommodations increase, and the miners begin to tunnel the banks and hills for gold, as they will soon do, the winter will present no obstacles to continuous work, under cover of adits, during the whole season."

MINING CLAIMS.

"A mining claim is a (parallelogram) piece of ground 100 feet wide, running from bank to bank of a creek. The depth is indefinite, varying of course with the width of the creek. Each miner is entitled to one of these 'claims,' and there may be several miners associated together to work a 'claim.' In case of such an association amounting to five miners, the 'company' would be entitled to 500 feet of ground in width and running from bank to bank. At first many miners 'took up' claims in simulated names, and thus caused a monopoly—an evil which was remedied by the Government Gold Commissioner when he visited the country in the summer.

MINING LICENSES.

The miner of British Columbia pays but a very small tribute for permission to dig for gold wherever and whenever he pleases in the colony. The mining license is only £1 sterling a year to foreigners and to British subjects alike without any distinction or preference of any kind. And this trifle is optional. It may be paid or not at pleasure. The payment gives the miner the protection of the law in vindicating his rights of property to his mineral ground or claim; and this advantage naturally operates as an inducement to take out the license, while it has at the same time the effect of preserving order by rendering the 'wild justice' of Judge Lynch uncalled for."

COST OF JOURNEY FROM VICTORIA TO CARIBOO.

"The cost of a miner in getting from Victoria to Cariboo would be from £10 to £12. As to security of life, I consider it just as safe there as in England. As to the mining prospects, they are clear as the sun at noon. Every able man who chooses to work will make money."

ESTIMATED GAINS.

79 miners took out an aggregate of	\$926,680
400 " claim owners, took out.....	600,000
1,021 " at \$7 a day, in 107 days.....	764,729
Total yield (nearly all) from Cariboo.....	\$2,291,409
1,500 miners who worked in other places for 180 days at \$10 per diem.....	\$2,700,000
2,000 ditto at \$6.....	1,800,000
5,000 miners—gross yield for 1861.....	\$6,791,409

"This does not include the native Indians, as I have no means of estimating their earnings. They are beginning to "dig," in imitation of the white man, in some parts, and will eventually increase the yield of gold, as the desire for wealth grows upon them."

DIRECT ROUTE THROUGH BRITISH COLUMBIA TO THE PACIFIC.

In July, 1859, Mr. William Downie made an exploration of the Skeena River, Babine Lake, and Stewarts, a feeder of Frazer River. The results are very important in view of a direct route across the continent. The Skeena flows into Port Essington, lat. 54° 15'.

The party, says Governor Douglas, of British Columbia, commenced the ascent of the Skeena in a canoe, which they managed to take on as far as the Forks, a distance of 110 miles from the sea. The river ceases to be navigable at that

point, in consequence, it is supposed, of falls and dangerous rapids; and they had to leave the canoe, and to travel 55 miles by land to the Indian village of "Naas Glee," a celebrated native fishing station, from whence the Skeena again becomes navigable to its source in "Babine Lake," 15 miles beyond "Naas Glee."

Babine Lake is a broad and extensive sheet of water, nearly 90 miles in length, with depth sufficient for vessels of the largest class; and is separated by a low table-land 13 miles in breadth from Stuart's Lake, a feeder of Fraser's River, not quite so large as Babine Lake, but otherwise equally well adapted for the purposes of navigation.

Mr. Downie made several important discoveries in course of his adventurous journey. He found gold in small quantities on the Skeena River; and the mountains, which he had not time to explore, appeared to be of the formation containing gold; he also saw very valuable and extensive beds of coal. He moreover found gold on Stuart's Lake. He describes the country between the Forks and "Naas Glee" as being well adapted for farming, and suitable for the construction of roads. The whole distance from Babine Lake to the sea does not appear to exceed 180 miles, a great part of which is accessible by water.

"The valley of the Skeena is thus shown to be an available avenue into the interior of British Columbia, and will, I have no doubt, soon become a most important outlet for the upper districts of Fraser's River, which, from the course of the river and the direction of the coast, are brought in close proximity with the sea.

"As a means of supplying the distant mining districts of British Columbia by a shorter and cheaper route than the valley of Fraser's River, its importance will soon be appreciated and attract the attention of the mining and commercial classes; and I believe that the day is not far distant when steamers will be busily-pling on the waters of the two great inland lakes."*

Mr. Downie and his party suffered many privations, but in the true spirit of an explorer, Mr. Downie says in his Report to Governor Douglas,

"The only thing that supported us was the grand idea of the enterprise we were engaged in—that of being the first party to explore the route from the Pacific to Fraser's River, which will one day connect the Atlantic with the Pacific Ocean."

CONCLUSION.

Reader, glance for one moment at what the Hon. W. H. Seward thought and wrote in 1857, after visiting Labrador and parts of Canada, when in cool blood he mused over the destinies of the country and its future relations to the States.† The Hon. W. H. Seward is playing a great part now on this continent; his opinion of the FUTURE OF BRITISH AMERICA is worth weighing. If you are a British subject it will encourage you in bright hopes for "VIGOUROUS, PERENNIAL, AND EVER-GROWING CANADA," and for an OVERLAND ROUTE TO BRITISH COLUMBIA.

* Papers relating to British Columbia.

† A cruise to Labrador,—Log of the schooner *Emerence*—Correspondence of the *Albany Evening Journal*, by the Hon. W. H. Seward, now Secretary of State, United States.

"No one is more truly a waiter on Providence than the traveller who depends on sails to be filled by favouring breezes. Ten watches of the day and night have passed since we left Anticosti, and yet we are only seventy miles nearer our port. But we have had balmy summer skies and a gentle summer sea, not a craft of any kind has darkened our horizon. It is to us as if the human world beyond it was not. The sea birds have circled our masts, crying for crumbs from our table, as it has been bountifully spread a half dozen times on deck, either in the sunshine or in the shade of the canvass. The whale has blown his loudest note on his bugle in distances so remote that the eye could not detect him, though so well directed by the ear; and again he has rolled lazily by the vessel's side, exposing his vast proportions, as if this most just log of ours was not already filled with oily narratives of the hydraulic exhibitions of his race.

"Then the nights. There has been no moon. But the stars have spangled the sky from the zenith down to the water's edge—hundreds of ambitious light-houses offering their services officially to mariners who lay becalmed, and, therefore could not lose their way. And the Aurora, emulous, has made a dozen milky ways in all fantastic forms, and gilded their verges with pink and gold borrowed from the richest sunsets. The sea itself has been luminous, as the surface was broken by the prow, and rolled off waves of phosphorescent light, so brilliant as to discover the doings of the inhabitants who dwell in its dark chambers. And now all this is passed. The east wind we have impatiently sighed for has come at last, and it has brought as usual in its train fogs, clouds and cold rains. But these are attended by their compensations. The Seven Islands are passing behind us, and we are trying, not without hope, to reach the Point de Monts, and leaving the Gulf to enter the channel of the River before the third Sabbath of our voyage dawns upon us.

"Dreamy existence is this living at sea in the summer. Perhaps my meditations on the political destinies of the region around me, may be as unsubstantial. But I will nevertheless confess and avow them. Hitherto, in common with most of my countrymen, as I suppose, I have thought Canada, or to speak more accurately, British America, a mere

strip lying north of the United States, easily detachable from the Parent State, but incapable of sustaining itself, and therefore ultimately, nay, right soon, to be taken on by the Federal Union, without materially changing or affecting its own condition or development. I have dropped the opinion as a national conceit. I see in British North America, stretching as it does across the continent, from the shores of Labrador and Newfoundland to the Pacific, and occupying a considerable belt of the Temperate Zone, traversed equally with the United States by the Lakes, and enjoying the magnificent shores of the St. Lawrence, with its thousands of Islands in the River and Gulf, a region grand enough for the seat of a great empire. In its wheat fields in the West, its broad ranges of the chase at the North, its inexhaustible lumber lands, the most extensive now remaining on the globe—its invaluable fisheries, and its yet undisturbed mineral deposits, I see the elements of wealth. I find its inhabitants vigorous, hardy, energetic, perfected by the Protestant religion and British Constitutional Liberty. I find them jealous of the United States and of Great Britain, as they ought to be; and therefore when I look at their resources, I know they cannot be conquered by the former nor permanently held by the latter. They will be independent, as they are already self-maintaining. Having happily escaped the curse of slavery, they will never submit themselves to the domination of slaveholders, which prevails in, and determines the character of the United States. They will be a Russia behind the United States, which to them will be France and England. But they will be a Russia civilized and Protestant, and that will be a very different Russia from that which fills all Southern Europe with terror, and by reason of that superiority, they will be the more terrible to the dwellers in the southern latitudes.

"The policy of the United States is to perpetuate and secure the alliance of Canada while it is yet young and incurious of the future. But on the other hand, the policy which the United States actually pursues is the infatuated one of rejecting and spurning VIGOROUS, PERENNIAL, AND EVER-GROWING CANADA, while seeking to establish feeble States out of decaying Spanish Provinces on the coasts and in the Islands of the Gulf of Mexico.

"I shall not live to see it, but the man is already born who will see the United States mourn over this stupendous folly, which is only preparing the way for ultimate danger and downfall. All Southern political stars must set, though many times they rise again with diminished splendour. But those which illuminate the Pole remain forever shining, forever increasing in splendour."

PRACTICAL OBSERVATIONS
ON THE CONSTRUCTION OF A CONTINUOUS
LINE OF RAILWAY FROM CANADA TO THE PACIFIC OCEAN
ON BRITISH TERRITORY,
BY SANDFORD FLEMING, ESQ., C. E.,
Engineer to the Northern Railway of Canada.

TO HENRY YOULE HIND, ESQ., Professor, &c., &c.

DEAR SIR,—According to your request, I have much pleasure in submitting the following observations on the construction of a highway, within British territory, from Canada to British Columbia.

Opening a communication for commerce between the western and eastern shores of North America, through the great basins of the St. Lawrence, the Saskatchewan, and the Columbia, has for nearly two centuries been a dream of the enthusiast. So far back as 1679 Robert Cavalier de la Sale formed to himself the magnificent scheme of opening a way to China and Japan through the Lake regions of Canada; and curious enough, the rapids and village of Lachine, near Montreal, took their names, either in honor or in derision of La Sale's project, when he set out on his grand enterprise. About fifty years later Charles Marquis de Beauharnois, Governor of New France, projected an attempt to communicate with the Pacific, and in pursuance of which Pierre Gauthier de Varennes set out in 1731 and was the first to reach the Rocky Mountains.

Of late years the project has been brought prominently before the public in England and in Canada by many writers, amongst others,

Lieut. Millington Henry Syng, R. E., in 1848; Major Robert Carmichael-Smyth, and a Mr. Wilson of the Hudson's Bay service, in 1849; Allan Macdonell, Esq., in 1850, and Captain Thomas Blakiston, R. A., in 1859. Each laid their views before the public, and warmly advocated the importance of opening up the interior of British North America by a highway from ocean to ocean.

In 1858 the Provincial Legislature of Canada incorporated a joint stock company for the purpose of opening up the interior and trading therein. This body, entitled "The North-West Transportation Navigation and Railway Company," was granted most extensive powers; besides trading in furs, tallow, buffalo meat, hides, fish-oil, and other articles of commerce, the company was empowered to improve and render navigable the various channels of water communication; to construct links of roads, tramways, and railways, between navigable lakes and rivers, so as to provide facilities for transport from the shores of Lake Superior to Fraser's River. They had likewise the right to own and employ vessels of all kinds "upon Lakes Huron and Superior, and upon all the waters, lakes and rivers lying to the northward and to the westward of the latter, thereby offering to their energy and their enterprise a new and vast field for commercial adventure." The directing board of this company was the same year fully organized, it embraced some of the leading names connected with Canada, but from some cause it has as yet made no progress in the objects contemplated.

From the above brief sketch of the history of the project of establishing a highway from Canada across the continent it appears that it has from the earliest settlement of the country bordering on the Atlantic, been considered a magnificent scheme for the extension of commerce and civilization; the Palliser expedition across the Rocky Mountains, the Assinniboine and Saskatchewan expedition, show that it has very lately received the attention of the Imperial as

well as the Colonial Governments; the recent discovery of gold on both slopes of the Rocky Mountains, gives it much additional interest, and lastly, the difficulties between the United States and Imperial Governments, for the present happily set aside, have not failed to show its vast importance as an engine of military defence.

It seems likely then, that although the means of transport for nearly 2,000 miles are as yet scarcely better than they were when La Sale attempted to traverse the continent almost two centuries ago, the time is rapidly approaching when a highway across the continent will no longer, by any one be viewed as visionary.

Before proceeding to consider the construction of the work practically it will be necessary to discuss its character, and profitable to view its magnitude.

ITS CHARACTER.

A CONTINUOUS LINE OF RAILWAY ADVOCATED.

The early French Projectors appear to have had the idea of opening a water communication to the Pacific through the lakes and rivers of Canada and the interior. Nearly all the recent writers on the subject have proposed in different ways to improve and render navigable the natural lines of water communication. I am not aware however, that any of the latter, by reason of their knowledge of the great Rocky Mountain barrier, have contemplated a route wholly by water; they have generally advocated a mixed system, employing the water channels as far as possible, and connecting them by intermediate links of roads or of railways. On the other hand; Captain Blackiston appears to be much in favor of a land route, for the present, at least from the north shore of Lake Superior to Red River, by the north end of Lake of the Woods, at some distance inland from the international boundary line; and Major Carmichael-Smyth in 1849 boldly urged the construction of a "British Colonial Rail-

way" to connect *without break* Halifax on the Atlantic with the mouth of Fraser's River on the Pacific.

All the schemes proposed may be reduced to two kinds, viz.: partly water and partly land; and wholly land routes; the former may possess the advantage in point of cheapness in construction, but certainly not in regard to efficiency. By using the lakes and rivers as far as navigable or capable of being made so, and by constructing connecting links of roads or railways where necessary to complete the chain, it is more than likely that a line of communication could be formed from ocean to ocean at less cost than could a continuous land route;—a mixed land and water route would, however, be always open to the following objections: it would to a great extent, confine colonization to the banks of rivers and lakes where the soil is not invariably most suitable for cultivation: It would involve many transhipments, and be liable to frequent interruptions. It would necessarily be considerably longer than a direct land route, and, as a means of transport for "through traffic," would be slow and tedious,—it would too, and this objection is insuperable, be only available for any kind of traffic during less than six months in the year.* It is well known that serious delays frequently arise on canal navigation before the season terminates towards the close of navigation by reason of the press of business. The longer the route the greater would be these difficulties, merchants at either end, unwilling to run the risk of having goods arrested in the interior for half a year, would in consequence be debarred from sending consignments across the country for some considerable time before the water channels were completely closed, and hence it is believed that a partly land and water route would not be really serviceable for "through

* The navigation of the lakes and rivers on the line of route are closed from the middle of November to the 1st of June.—BLAKISTON.

traffic" over five months in the year. The local traffic of the interior would likewise be suspended for long periods, and at such times the country and its inhabitants would be as much isolated as they are now. In a military view alone this objection would prove fatal to any permanent route of an amphibious character; and it is probably on this ground, together with the fact that the water lines pass for a considerable way along the international boundary, that the two military gentlemen last named have extended their advocacy to a line of communication wholly by land through the interior.

A railway communication on the other hand would be the shortest practicable line that the physical features of the country would admit,—it would have no transhipments between tide water on the two oceans,—it would in most instances be carried through the heart of the country at some distance from lakes and rivers, and would thus open valuable tracts of land for colonization which could not be reached by navigable waters; when it touched or intersected water channels, these would form natural branches to it, and be available to their fullest extent in laying open the land along their banks for settlement. It would, as an essential and independent part of its equipment, be provided with an electric telegraph; the telegraph, as on other lines, would be available for purposes beyond the immediate requirements of the railway, and without doubt great benefits would result from the possession of this instantaneous means of communication.* The railway would throughout the year

* A telegraph would be much more expensive in the first place, and almost impossible to maintain on any line across the country other than a railway or other travelled land route, if carried around lakes or through hundreds of miles of uncleared forest, the wires would constantly be broken by fallen timber, and the posts frequently destroyed by running fires, inconvenient interruptions might thus occur when the telegraph was most in need. On a railway it is part of the duty of the trackmen to look out for fallen trees, and a break is thus speedily repaired when it occurs: when the line is cleared to a sufficient width interruptions from this cause are not frequent.

be open to transport "through" as well as "local" merchandise and passengers, and would, taken with the telegraph, in a military aspect be available at all times and seasons, and would undoubtedly prove an important as well as permanent measure of defence to the country.

It is not, however, to be supposed that the operating of a railway through this extensive country would be entirely free from difficulties; the permanent supply of fuel would be a question of no little moment, the intense frosts and the snow drifts of a long winter would have to be contended with. The latter is found in operating Canadian as well as other railways in a like northern latitude to be a cause of not unfrequent interruption to the regular running of trains, besides often the necessity of a heavy outlay. The drifting of snow, like all operations of nature is, however, governed by certain laws, and it is possible on a correct knowledge of them to adopt measures in the general design of railways and their appliances which may certainly diminish if they do not entirely remove the evil effects of the agency referred to. These questions will be more particularly referred to in their proper place.

Taking all things into consideration, and, notwithstanding the difficulties last mentioned, it seems as clear as a demonstration that a continuous line of railway, with its electric telegraph, extending across the continent is much to be preferred to a mixed system of navigation and railway combined, and therefore in the following observations it will be understood that a line of railway is the character of highway ultimately in view. It is true that in preparing the country for railway service the natural water channels as far as they go may be advantageously employed, but it would evidently be unwise to incur much expenditure on any route other than that best calculated to accommodate the permanent wants of the country and highest interests of the Colonial Empire.

ITS MAGNITUDE.

COST AND MAINTENANCE OF A RAILWAY AND TELEGRAPH LINE.

Having determined the character of the means of communication most desirable to be established it may be well now to glance at the comparative dimensions of the proposed work, and to consider the cost of its construction as well as the annual expense of maintaining it for ever afterwards.

Measuring on the map along the general route of the proposed line from the mouth of Fraser's River, through one of the best passes yet discovered in the Rocky Mountains, along the general direction of "the Fertile Belt," keeping south of the North Saskatchewan, crossing the Red River near the Settlement, bridging the Winnipeg River at the north end of the Lake of the Woods, striking through the country to the most northerly bend of the shore of Lake Superior, thence in a direct line to a crossing on the French River west of Lake Nipissing, and from this point connecting with the existing railway system of Canada, either at the Town of Barrie, or at Peterboro, or at the City of Ottawa; the distance thus measured will be found to be in round numbers about 2000 miles, and although a railway between the two oceans on British territory, cannot be considered perfect without the completion of the road between Halifax and the most easterly extension of the Grand Trunk in Lower Canada, yet as there is some prospect of this section being made independently, it does not appear necessary to embrace its length in the present consideration.

That a just conception may be formed of the real magnitude of the project under discussion, and the means necessary to its attainment, attention may for a moment be drawn to a few leading details. The construction of 2000 miles of railway measured by the average standard of similar works existing in this country implies the performance of labourers' work sufficient to give employment to 1000

men for 50 or 60 years,—it involves the delivery of 5,000,000 cross-ties or sleepers, and over 200,000 tons of iron rails for the "permanent way"—it comprises the erection of 60,000 poles hung with 1000 tons of wire for the Telegraph—it necessitates the creation of motive power equivalent to over 50,000 horses, which power would be concentrated in 400 Locomotives—it involves the production of from 5000 to 6000 cars of all kinds, which, coupled with the locomotives, would make a single train over 30 miles in length—and lastly it implies a gross expenditure on construction and equipment, of not less than \$100,000,000.*

It will likewise serve as a salutary check on hasty conclusions to weigh before hand the cost of operating a truly gigantic establishment of the kind after its perfect completion; a few figures derived from actual results will shew that the first construction of a railway through the interior of British North America is even a less formidable undertaking than that of keeping it afterwards open in the present condition of the country. For operating the line successfully, the fuel alone required in each year, and estimated as wood, would considerably exceed 200,000 cords—for keeping the road in repair a regiment of 2000 trackmen would constantly be employed in small gangs throughout its entire length; for the same purpose there would on an average be annually required 600,000 new cross-ties as well as nearly 30,000 tons of new or re-rolled iron rails—the annual repairs of Rolling Stock would not cost less than one million dollars—over 5000 employees of all kinds would constantly be under pay, and as these men would usually represent each a family, there

* Major Carmichael-Smyth estimated the cost of building a line of railway from Halifax to the Pacific at £150,000,000 sterling, equal to over \$700,000,000. but then he computes the expenditure as on English railways, where more money has been wasted in preliminary expenses and lavished on architectural monuments at Stations than would suffice to build an equal length of road in this or any new country.

would not be far short of 20,000 souls subsisting by the operation of the road. The aggregate amount of wages in each year after the road was in operation would swell out to nearly \$2,000,000, while the gross expenditure for operating and maintaining works would annually exceed \$8,000,000.

Again, if to this last sum be added the interest on first cost, it becomes evident that until the gross earnings of the railway in each year come up to the enormous sum of \$14,000,000, it could not pay interest on the capital invested.

ITS IMPORTANCE.

A GREAT NATIONAL WORK, A FIELD FOR LABOUR, AN ENGINE OF MILITARY DEFENCE.

The above computations taken by themselves are more than sufficient to deter any one from casting a second thought on the subject of constructing a railway through the unpeopled wilds of British North America, but when we again reflect on the vast importance of this great national work the belief is forced upon us, that at some period, *let it be a remote one*, the undertaking will certainly be accomplished. While most authorities have very fully dwelt upon the commercial advantages to be attained by a speedy means of communication across the country—while they have shown its value as a connecting chain between British Columbia, the Gold Fields on the slopes of the Rocky Mountains, the Settlements at Red River, and the Atlantic Provinces, as well as a link of connection between China, India, even Australia, together with other Dependencies on the Pacific and the Parent Land—while they have advocated it as the key to a new and almost boundless field for British capital, energy and enterprise—as a great instrument of colonization, opening up a territory of vast extent for the superabundant and rapidly increasing population of the European States, and in this respect involving the future and

permanent interests of civilization—yet it has not been the good fortune of the writer to peruse any article in which this undertaking is viewed as a most important measure of defence, as a work which may at some period save many millions sterling in carrying on a war, which may, if it does not prevent a war, save the Colonial Empire from dismemberment.

In times of Peace we are apt to overlook the importance of being able to concentrate troops and munitions of war at any given point on our extended frontier, but the recent difficulties between the British and American governments, could not fail to illustrate the military value of the several Canadian railways as well as the isolated and defenceless condition of the far interior. Had war not fortunately been avoided it is difficult to see how that vast and prospectively most valuable territory between the Lake District and the Rocky Mountains could have been protected from invasion and permanent occupation, and we are forced to the conclusion that until a highway is formed the interior of our country is indefensible. The Romans paid particular attention to the construction of roads through the distant Provinces of the Empire, and while the construction of these roads was one of the grand causes of civilization introduced into barbarous States, the great leading principle which actuated the builders of them, was that of maintaining their military supremacy, the first efforts of that people were directed to piercing new acquisitions to the Empire with good roads, and these roads wherever practicable were connected in unbroken lines with the seat of government at Rome. The remains of these roads are still to be traced in various ramifications through Europe, and so substantially were they constructed that they have for fifteen centuries perpetuated the power and foresight of their originators.

In modern times, Napoleon, one of the greatest, if not the greatest military authority, announced the maxim that the highest effort of

the military tactician was to concentrate a given number of men at a given place, at a given time. It requires no argument to prove that the Railway and the Electric Telegraph are the most perfect means for concentration of military power that could possibly be desired, and we can easily perceive with what comparative ease forces could be brought to bear through the instrumentality of these agents, on any point threatened with invasion.

True, we are again at peace with our neighbours to the south, and perhaps likely to remain in that happy state for a considerable time, but possibly not always; some good authority has laid down as a maxim, that to maintain peace, a nation must be well prepared for an opposite condition of things, and therefore we must see the value of the railway route to bind the several North American Colonies of Britain together. But it is not alone as a work of defence that the British Pacific Railway would be serviceable in a military sense; it cannot be forgotten that within a very few years back the British troops had to be transported with the greatest possible rapidity to India and again to China. Such exigencies may at any time occur again, either in the same lands or at other points in the same hemisphere, and it must be of the utmost importance to the Imperial Government to possess the means of carrying military forces more rapidly by a route over entirely British soil than by any other route along which they may come in contact with antagonistic nations.

I have already overstepped the limits of space which these preliminary remarks should have occupied, but I cannot proceed to the more practical section of this letter without first alluding to the efforts which for more than half a century have been made by the Imperial Government to discover a means of communication by water between the Northern Atlantic and the Northern Pacific Oceans. Although the persevering and sometimes heroic attempts to find a north-west passage have resulted in no direct advantage,

beyond a trifling contribution to science and geographical knowledge, yet they are undoubted evidence of the high commercial and military value which the British Government has long placed upon the possession of a means of communication between the two oceans in the northern hemisphere; and while the expenditure of a sum considerably over a million pounds sterling has only proved that a passage through the Arctic Seas cannot be established, the very impracticability of the passage which the outlay of so much treasure as well as the loss of so many valuable lives has demonstrated, must without doubt add immensely to the importance of the only practicable route across the continent, on British soil.

SCHEME OF CONSTRUCTION.

THE COMPLETION OF THE RAILWAY A WORK OF TIME.

The idea of constructing upwards of 2,000 miles of railway in the manner which has characterised the establishment of similar undertakings heretofore, through a country almost uninhabited except by scattered bands of wandering Indians, may well be viewed as a commercial absurdity. It has been shown that the maintaining and operating of a railway of this extent, after its perfect completion, would cost not less than eight million dollars per annum, and that its traffic would have to yield in gross receipts fourteen millions of dollars every year to enable the work to pay interest on the capital invested.

Could it be satisfactorily shown that these receipts might even be approached, the work would undoubtedly be a legitimate investment for private capital, and we might fairly expect to see it undertaken by private enterprise, but at present no such inducement can be held out; however important the line would be in many respects the business of the country traversed could not for many years yield more than a fractional part of the revenue required to keep it open,

and the traffic from ocean to ocean could not be expected even by the most sanguine to give constant and profitable employment to a force of four hundred locomotives, without which the road would scarcely pay.

It appears conclusive therefore that the immediate construction of a railway from Canada to the Pacific is in a financial sense impracticable, seeing that it would not at present pay; and however important it may be considered as a great national work its successful operation as a commercial undertaking cannot take place until the country is better prepared for it.

It must not however be implied that the idea of establishing a continuous line of railway from ocean to ocean should even at the present time be set aside. It may be laid down as a maxim that wherever traffic *can exist* sufficiently extensive in any section of country to render the application of steam power profitable through that section a railway will sooner or later be constructed. The country between Canada and the Pacific is, according to reliable authority, in every respect capable of supporting a large industrial population* half as large perhaps even at a moderate computation as the population of the whole United States—the population of the whole United States sustains over 30,000 miles of railway, and therefore we may reasonably conclude that long before the interior

*Assuming that only that portion of British America west of the Lake of the Woods and south of the main or North Saskatchewan River, is capable of being populated to no greater density than Russia, the least populous country in Europe, Norway and Sweden excepted, within these limits a population of 15,000,000 would be contained, (the density of the population of Russia is only about one-third that of the settled portion of the Canadas). The occupation of this portion of the country need not be considered a great encroachment on the territory from which the Hudson's Bay Fur Company derives its revenue, it would still leave 2,000,000 square miles, an area four times greater than that assumed to be populated, an area quite as extensive as Russia, and abundantly sufficient, it is presumed, for a hunting ground.

of British America is fully occupied, a leading line of railway communication through it may be successfully operated and profitably sustained.

The question of opening up new territories for settlement by means of some comprehensive and economical road system engaged my attention a few years ago when I had the honor to read two papers on the subject before the Canadian Institute, and I cannot but think that some of the conclusions then come to apply with peculiar force to the subject matter of this letter. In one of these papers a retrospective view was taken of the process by which the Province of Canada had become habitable and inhabited, so far at least as lines of internal communication had been instrumental in producing these results, and an analytical examination of the existing road and railway systems was made, as well as an enquiry into the means employed to produce them. From these enquiries, instituted with the view of arranging some more perfect system of road development for advantageous introduction into unoccupied districts, certain deductions were drawn, of which the following may at present be submitted.

In carrying railroads, the most perfect of all roads, into remote unsettled districts, two great difficulties have to be encountered at the outset:—First, their construction; secondly, their maintenance.

The former may be overcome by a process which strongly resembles a law or principle in mechanical science, by which we are taught that time is an element of equal importance to power in the performance of mechanical operations. The construction of a railway with all its parts is nothing more than a complex mechanical operation, whilst capital or money may be designated the force or power employed to bring about the desired result; a large expenditure of financial force is undoubtedly required to accomplish the object within a short period, but owing to the peculiar relation between

power and time the employment of a small amount of force or capital would equally accomplish the same end in a longer period; both of these elements are indispensable, but they are not necessarily required in fixed proportions, if we use the maximum of the one we only need the minimum of the other,—if circumstances in any particular case will not justify a large expenditure of capital then time may be extensively employed to accomplish the work in hand.

The second difficulty above referred to, viz.: that of maintaining a railway in a new district after its completion, although by far the most serious of the two, is one which fortunately can be removed by a particular solution of the first. It is obvious that to put a railway in a condition of being self-sustaining, the traffic of the country through which it passes must first be developed, for however important and promising the "through traffic" of any projected line may appear, experience has shown on nearly all railways that the "local" or "way traffic" is that upon which they must mainly depend for a revenue. The local traffic of a new territory can only be developed by the introduction of labour and inhabitants; this is a work of considerable time even under the most favorable circumstances, but until this be done it is useless to expect sufficient traffic, and without sufficient traffic the railway cannot maintain itself.

In applying the foregoing to the question of forming a railway connection between Canada and the Pacific, it would follow that whilst the completion of the work at the earliest period possible would absorb an enormous amount of capital, and leave the line for many years without the means of earning sufficient to sustain itself, the gradual process of construction would draw upon capital only to a limited extent, and it would leave the railway finished when the traffic was sufficient to keep it in profitable operation.

The former course may fairly be rejected as incompatible with the

first principles of economy, the latter being perhaps the only alternative, forces us to the conclusion that the gigantic work under consideration, to be constructed at all must be viewed as a work of time; and it remains for us to consider how the time at command can be most profitably employed to bring about the desired result.

THE ROAD SYSTEM OF CANADA,
CONSIDERED IN VIEW OF A COMPREHENSIVE PLAN FOR NEW TERRITORIES.

In pursuance of the object in view, it may be satisfactory and profitable to refer briefly to the leading characteristics which have marked the origin and improvement of the roads as well as the introduction of railroads in the settled portion of Canada.

The settled or partially settled portion of Canada embraces an area estimated at 35,000 square miles; its road system or means of inter-communication exclusive of navigable channels, consists of nearly 2,100 miles of railway in full operation, of probably 3000 miles in the aggregate of improved roads, comprising those made of broken stone, gravel and plank, and in round numbers of 50,000 miles of what are termed road allowances; of the last it is estimated that considerably less than one-half the total length is cleared of the timber and so far improved as to be passable for waggons, the remainder being as yet uncleared and in part permanently impassable.

The road allowances demand some explanation; they are invariably one chain (66 feet) in width, and are left between the square or rectangular blocks of farm Lots, into which the whole country has been subdivided for settlement; they are consequently in parallel lines, and in two sets, the one crossing the other at right angles, leaving blocks between of two or more farm lots of 200 acres each.

The aggregate area of these road allowances is extremely liberal, as it cannot be much less than 400,000 acres, but from the manner in which the allowances are laid out they cannot in all cases be em-

ployed for the purposes intended ; they are, however, much used by the farmers in common for pasturing cattle. Where the country is level and free from lakes, rivers or other obstructions, the road allowances have been converted into good summer waggon roads by the annual performance of statute labour and they give ready access to the farm lots ; where the country is hilly or broken on the other hand, great difficulty has been experienced in making them passable, and in many instances this is impossible, and in others after a great deal of money and labour had been expended, the original road allowances have been abandoned for better locations.

As the settlement and trade of the country advanced a demand was made for a more improved class of highways on the leading lines of traffic ; this led to the construction of plank,* gravel or broken stone roads through different parts of the country, and may be said to constitute the second stage in the development of the road system.

As the road allowances were left in the original surveys more to mark the limits between blocks of land than to accommodate the future commercial wants of the country, they did not long remain the only means of communication between one business point and another. Increasing traffic frequently called for roads with easier grades than those to be had on the original road allowances, and in cases where it sought an outlet diagonally across the country, it demanded a shorter line than the old rectangular zig-zag one ; in this manner new and more perfect roads were constructed in various sections of the country.

The third and last stage in the establishment of lines of internal communication within the Province, was the formation of railways ; these were first introduced about ten or twelve years ago when the increasing commercial wants of the country appeared to demand a greater degree of rapidity, safety and security of transport.

* The first plank road was built in Upper Canada in 1838.

Although the location of railways through any district requires a higher degree of care and skill than that of gravel or other roads of a like character, yet it is governed by precisely the same principles, and the general direction of all lines is prescribed by the leading direction sought by traffic; hence we find that the various lines of railway have been constructed parallel, or at least in a parallel direction to the various stone or plank roads which have preceded them, although they are frequently found at some distance asunder: this is a peculiarity which cannot fail to have been observed by all those acquainted with the country.

From the above brief outline of the origin and history of the lines of commercial intercourse within the Province, it will be seen that three distinct classes of roads have at different times been constructed to meet the requirements of traffic. First we have common earth roads on the original road allowances. Second, gravel, plank or broken stone roads in improved locations. Third, railways constructed quite independently of the other two—showing as a rule that three distinct works have been made, involving as many separate expenditures before the final object is attained. The only exception to this rule are where the second class have been made on the lines of the original road allowances, but these exceptions have perhaps been even more expensive to the country than when the rule has not been departed from.*

* In a Report made by Thomas Roy, Esq., Civil Engineer, in 1841, to the Governor General of Canada, reference is made to the excessive cost of making good roads on the line of original allowances drawn straight through the country across ravines, over hills, through swamps and other hindrances. Amongst other cases where attempts have been made to construct improved roads on such lines as that alluded to he instances the following: "The grants were made to macadamize Yonge Street Road from Toronto to Holland Landing, near Lake Simcoe. Now Yonge Street Road was so located that it was extremely difficult and expensive to form it into a tolerably good road. On that portion which has been already done nearly as much money has been expended in cutting hills, building bridges, &c. &c., as in road-making, yet

It may also be observed that the system adopted has in minor details unavoidably resulted in many permanent inconveniences to the trade of the country, which under other arrangements might have been obviated; as an illustration it may for the present be sufficient to allude to the inconvenient distances which nearly all the railway stations are from the towns and villages they are intended to accommodate. It may further be noticed that a degree of competition likewise obtains between the parallel lines of communication throughout the country, alike injurious to the interests of both. A stone road running parallel to a railway cannot fail to share with it the traffic of the locality, perhaps just sufficient to prevent the later line from paying, while the former is deprived, by the more recent work, of the revenue it had a right to anticipate when originally constructed. True it may be said that the country benefits by the rivalry between parallel lines; this, however, is very questionable, as both roads cannot permanently continue to be maintained at a loss, they must either fall out of repair or the tolls must be raised to enable them to pay dividends. Could these stone or other improved roads, instead of being parallel to the railways, be extended as branches to them from the stations, it is apparent that then the

several of the inclinations are as steep as 1 in 14. That portion which remains to be done is still more difficult, and it will be more expensive. Now, if previously to commencing the work an experienced Engineer had been instructed to examine the country and to lay out a road upon the best ground which he could find between Toronto and Holland Landing, he would have discovered that between 3 and 5 miles west of Yonge Street Road, a line of road could have been got from Toronto to the base of the Ridges, (about 25 miles,) without crossing one ravine, or meeting any difficulty except the hill to the north-west of Toronto; and farther, that the Ridges could have been crossed in that direction without involving any considerable difficulty. The result is, that the same amount which has been expended in making about fourteen miles of a very indifferent road, would have made about thirty miles of excellent road, leaving no inclinations steeper than 1 in 40; a circumstance that would have produced a great saving in repairs, and in expense of animal strength."

country generally would derive greater advantages, while the different classes of communications, in performing their proper functions, would receive corresponding benefits to those they conferred.

It is not for a moment presumed that a re-arrangement of existing lines of traffic such as that suggested is now possible; but these remarks are offered with the view of showing some of the benefits which would result from a pre-arrangement of internal communication in a new country, such as I will take occasion to refer to shortly.

Before attempting to show how we may best profit by the experience obtained from the Canadian road system in any effort to colonize the interior of British North America, I will first allude to another point which doubtless has suggested itself to many others, and which I think is of some moment.

If we proceed to analyse that portion of a perfect railway upon which the trains are rapidly transported we find that it consists essentially of the following parts: 1st, Two smooth parallel and horizontal surfaces upon which the wheels of the carriages roll; these are formed by iron rails resting upon cross-ties and supported by chairs or other fixtures, the whole being termed "the permanent way" or "superstructure." 2nd, A layer of gravel or broken stone from fifteen to thirty inches in thickness immediately under and around the cross-ties, and technically called "the ballast." 3rd, An earthen-surface uniformly even and properly ditched at the sides. This surface is termed "the formation level," and on it the ballast is placed, and thus proceeding downwards from the completed rail track we have:

- 1st. The Permanent way.
- 2nd. The Ballast.
- 3rd. The Formation Level.

To those who have observed the successive stages of railway building it will be clear that "The Formation Level" is not dissimilar, except in possessing easier grades and curves, to the best description

of "common earth roads," and might readily be used for all the purposes for which the latter are employed. Again, when "the Formation Level" becomes coated with "Ballast" we have what is designated "The Road-bed," and which, without any portion of the "Superstructure," corresponds with the general construction of "Gravel" or "Stone roads." If, therefore, we invert the order above given, and likewise substitute new names, we have,

- 1st. *An Earth Road*, corresponding with the Formation line.
- 2nd. *A Gravel or Stone Road*, corresponding with the Road-bed.
- 3rd. *A Railway*.

This is precisely the order in which the leading lines of communication have been formed in Canada, and although each work-as a rule has been constructed independent of the other, and thus necessitated separate expenditures to accomplish one end, yet it does not appear a difficult matter to point out how the same object can be better attained in new territories to be settled, by a simpler and less costly system. Were the railway line first located, the common classes of roads which naturally precede it might first be made (on the railway location) and used until each in its turn merged into its successor; and by such a plan it is clear that considerable saving would result on the final establishment of the railway; There might be new earth works needed where the ground was broken by ravines and hills, as well as stronger bridges across rivers, but no outlay would be necessary for land, or for clearing and grubbing, at any place, and on level sections of the line, such as occur on all roads, the only additional expense would be that for the superstructure.

A ROAD SYSTEM FOR NEW TERRITORIES.

TOTALITY AIMED AT, AND PROVISION FOR FUTURE RAILWAYS ADVOCATED.

From the foregoing observations it must be obvious that the progress of new territories, as well as their future and permanent social

and commercial wants would be much influenced by a pre-arrangement of the various lines of internal communication; and it must be equally clear that to attain the highest degree of easy intercourse between every section at the least outlay of capital and labour every road of whatever class, should be considered as a portion of a whole system.

The system of construction proposed to be advocated is that of a gradually progressive character, similar to that already hinted at, and inasmuch as it would evidently be a misnomer to designate the various lines of roads in their rudimentary stages by the names they may ultimately be intended to bear, it is thought that the following terms for the three classes of lines will be convenient and sufficiently appropriate.

1st. *Territorial Roads*.—These trunk lines, intended to serve large districts, and which may in course of time be converted, stage by stage, into railways as the settlement of the country advances and its traffic becomes developed. “Territorial Roads” to be invariably located with easy curves and on the most available ground for railway service.

2nd. *Colonization Roads*.—Those lines of secondary importance, to be opened in the first place for the better introduction of settlers, and which may without change in their direction be converted in course of time into good gravel or macadamized roads.

3rd. *Concession Roads*.—Those lines of least importance, designed simply to give access to farm lots from the leading lines last mentioned. Concession roads might be laid out generally across the colonization roads, and between the several blocks into which townships are usually sub-divided.

In pre-arranging a system of internal communications for a new territory, it would be necessary to take a prospective view of the character of the traffic which might exist when after a lapse of years

the district becomes populated; in this we might be guided by drawing a comparison between the natural advantages of soil, climate and position of the section of country to be colonized with those of any similar section which has become occupied and to some extent developed. In this manner we could form some idea of the nature of the future commerce of the country, and consequently of all the classes of roads which would ultimately be required to accommodate it. The leading direction which traffic may seek, or the direction which in a national or political sense it may appear expedient to guide it, would prescribe the general direction of the main line of road through the territory, and the other consideration would determine its character. This is the first thing to be established, as upon it the direction and character of all minor lines mainly depend.

Assuming that the tract of country to be colonized is such as to justify us in the belief that in due time a railway may be constructed through it, the first step would be to lay out a "Territorial Road" between the more important points in the general direction of traffic previously determined. The territorial road ought to be located with the utmost care and in all that relates to curvatures and levels the best railway location in an *engineering aspect alone* which the country traversed could afford. In this respect there would doubtless be less than usual difficulty, as there would be neither right of way obstacles to guard against nor local interests to serve, and consequently no undue influences to twist or warp the intended line out of the most advantageous location. The main artery of traffic for the future service of the country might thus be determined upon under most favourable circumstances.

It would next be necessary to select at proper intervals the most suitable points for stations and villages, and from these as diverging points "Colonization Roads" might then be laid out to the right and left with as much care as the location of gravel or macadamized

roads generally require. These colonization roads thus laid out and adapted to the peculiar features of the locality, avoiding steep hills, ravines, lakes or unnecessary river crossings, might form centre or governing lines upon which the townships may be projected; these townships to be sub-divided in the usual way into blocks of farm lots with concession roads between, drawn so as to unite with the colonization roads.

The above is a simple skeleton outline of a road system which it is thought might with advantage be introduced into unoccupied fields, and although it may be unwise to complicate it with too many details still there is one additional point which seems too important to be passed over. I have already alluded to the difficulty experienced in operating railways where the road is liable to be blocked up with snow drifts,* and I may now refer to the extreme necessity of making some provision for a permanent and convenient supply of timber for fuel and general repairs.† As a preventive against the

* It has been pretty well established that the most efficient preventive of snow drifts is to preserve the woods along each side of the rail-track beyond the line of fences. Trains are seldom detained by snow evenly fallen through wooded parts of the country, as it scarcely ever falls so deep between trains as to offer any inconvenience. The detention to trains from snow always occurs in the open country where the woods have been cleared away and no obstruction is presented to the formation of snow drifts on certain exposed positions.

† In districts where no coal exists and in consequence wood is employed as fuel, and more especially in those sections of the country where the absence of navigable water channels renders the more expensive system of land transport necessary, it would seem good policy to husband the growing timber for future wants. Already in some parts of the United States the difficulty and expense of procuring fuel for Railways and for other purposes is beginning to be felt; in Canada the Railways alone consume not far short of 300,000 cords every year, thus involving the annual destruction of more timber than is generally obtained from an area of six thousand acres, and in all countries in a northern latitude, beyond the convenient reach of coal-fields the conservation of sufficient areas of timbered lands must become of increasing political importance. To ascertain the extent of woodland sufficient to

former, and as an ample provision for the latter, I would suggest that a belt of wood land along the territorial line of sufficient breadth should be reserved for shelter and the purposes above mentioned. The belt of wood-land to be at all effective against the worst effects of snow should be of a considerable width, sufficient in fact to shelter the line of road and arrest the snow drifts beyond the limits of the line of traffic. In open sections of the country it might, in view of the same end, be advisable to encourage the growth of timber on reserves to be left for the purpose along the line of road. The uniformly even falls of snow would of course always occur, but on railways these are easily overcome by light snow ploughs attached to the front of the engines, and they seldom interfere with the regular running of trains.

These continuous timber reserves along the sides of the territorial road, whilst they would greatly lessen the difficulty of operating a

yield a permanent supply for a given rate of consumption, the writer a few years ago initiated the following steps: A piece of average timbered hard-wood land was selected, a rectangular portion was staked off, within the limited area each tree was separately examined, the length and circumference of the trunk and main branches as well as the thickness of the rings of annual growth of each were ascertained, and upon this data was calculated the quantity of solid wood annually produced by the process of vegetation. The result gave about 60 cubic feet of solid timber to the acre, and allowing for the interstices between each stick as usually piled, this may be considered equal to about three quarters of a cord; consequently to yield a perpetual supply there ought to be one and a third acres of timber land reserved for each cord of wood required annually.

Taking the above as correct and assuming that a Railway with ordinary traffic consumes annually 150 cords of wood for every mile of road operated, it follows that 200 acres should be reserved for the growth of fuel for every mile of Railway. In like manner it can be shown that cross-trees or sleepers would require about 40 acres for every mile, and fencing as much as 24 acres for each mile of Railway. It appears obvious, therefore, when we consider the many other purposes to which timber is applied in the maintenance of a Railway and its Rolling stock, that there ought to be about 300 acres per mile reserved for the growth of timber for all purposes. A belt extending a quarter of a mile beyond each side of the line of road would fully embrace the required area.

railway along the same line in winter,* as well as provide a permanent supply of wood for fuel and general repairs, they would moreover result in several incidental advantages favorable to the construction and maintenance of the future railway as well as to the safety of the public.

As all the roads in every section of the country along the line of the intended railway would connect through the "Colonization Roads" directly with the stations, the traffic would naturally centre at these points, and at these points only would railway crossings by public roads be required. Again, there would be no private or "farm-crossings" needed, as the farm lots being laid out subsequent to the location of the road, would of course be wholly either on one side of it or the other, besides being separated from the road by the timber reserve. The advantages resulting from these arrangements would be threefold, viz.: in original construction, subsequent maintenance, and public safety. In original construction it is clear that no bridges, level-crossings, cattle guards or gates would be required at any part of the line, other than at stations, to accommodate public roads, and at no place whatever would farm crossings be needed. In maintenance, corresponding advantages would result, as the repairs of these works, generally of a perishable nature, would be for ever saved, and the constantly recurring damage from cattle straying on the track would be very greatly lessened. Public safety would undoubtedly be greatly promoted by any plan which would diminish the number of road crossings. In any country subdivided for settlement in a manner similar to Canada before the railway lines are laid down we cannot avoid having the road crossings almost one in each mile.

* The obstacle presented by snow drifts is the great difficulty in the way of operating railways in winter in high latitudes. The cost of clearing away the drifted snow on some portions of the Canadian Lines, in the winter of 1860-1861, was very great. The drifts invariably occurred where the adjacent country was cleared of its timber.

so that on every 100 miles of railway we have probably in the aggregate over 5,000 lineal feet of track not only destitute of protection but exposed day and night to waggons, foot passengers, and cattle passing to and fro. Besides which the great number of cattle guards required is an important element of danger. These being made of timber beams are equivalent to small wooden bridges, and their great number swells out the total length to something very considerable. On all the railways in Canada the cattle guards it is estimated cannot measure less than 20,000 lineal feet of track, and are probably not much less dangerous than the same length of wooden bridges. In addition to the public road crossings above alluded to, there are a very great number of ordinary "farm crossings," which in point of safety to the public travelling by rail as well as to the property of the railway companies, are perhaps equally to be feared, for although they are protected by gates these are constantly liable to be left open, either through the design or negligence of farm servants.*

In the road system recommended for new districts, the railway whenever it came to be operated would be entirely freed from farm crossings, and the public road crossings would only occur at stations

* "One of the most fruitful sources of accident are the great number of crossings of street, highway, and farm roads at the level of grade. The total number of these is over eight thousand, and there is an average of three to each mile of road in operation, and more than one public road or street crossing to each mile. It is believed that nearly ten per cent. of all the accidents by which persons were killed or injured, is due to this cause."

"The expense of maintaining watchmen at many of these crossings, and the damage to the property of the companies by collisions caused by them, render them costly."

"The policy of reducing the number of those at grade, is generally conceded; and it is recommended that authority be given to change road-crossings which are at the level of grade, whenever it can be done without much detriment to the travel, so as to have two or more roads use one crossing; and, in all cases, where it can be done at a reasonable expense, to require them to be carried over or under the railroads."—Report of the Board of Railroad Commissioners to the Legislature of the State of New York, 1856.

where the danger of accidents is always least, from the fact, that the speed of trains is invariably reduced at these points.

Before proceeding to consider how the road system suggested would apply to the wide areas of unoccupied lands in the interior of British America in view of colonizing them, as well as of ultimately establishing a leading line of railway from the settlements of Canada to the Pacific, I may observe that two principal objections present themselves to the system advocated.

The expense of making the surveys and laying out the land for settlement would undoubtedly be much greater than that required to lay out wild land in the usual manner; but then while the old plan is simply to divide the country into rectangular lots without any sufficient provision for future traffic or present access; the new plan has a double object in view, it has, in addition to the purposes contemplated by the old system, that of making every part of the country accessible in the readiest way at the minimum expenditure, and with the greatest permanent advantages attainable. Another objection arises from the proposal to keep the territorial road lines wooded on both sides except where stations may occur, thus rendering the road less agreeable to travel on than if the cultivated country was allowed to be immediately adjacent. This is undoubtedly an objection, but I think that it cannot weigh much when the benefits to be expected ultimately from the preservation of the wood is fully considered.

A HIGHWAY TO THE PACIFIC.

A PLAN OF GRADUAL DEVELOPMENT RECOMMENDED.

In the foregoing observations it has been my endeavour to show, as briefly as possible, the following points:—

1st. That the project of a highway to the Pacific is as old as the first settlement of Canada, and that recent events show its increasing importance.

2nd. That a continuous line of Railway with Electric Telegraph is better calculated to meet the permanent wants of the Country and serve the interests of the Colonial Empire than any other means of communication between the two Oceans.

3rd. That although the magnitude of a scheme for a Railway across the Continent is very great, yet the vast importance of the work, in a commercial, military, and national view, would demand its construction were the resources of the country and the traffic sufficiently developed.

4th. That the immediate completion of this work cannot be seriously entertained in the present condition of the country, the cost of maintenance without sufficient traffic being so very great, and that therefore, to be constructed at all, the Railway must be a work of time.

5th. That the Canadian Road and Railway system has illustrated the advantages which may be derived from the adoption of a comprehensive Road scheme in laying open new districts for settlement.

6th. That a scheme which embraces the ultimate completion of Railways and less perfect lines of communication by a progressive system of construction possesses many features favourable to the first settlement as well as the future requirements of the traffic of new Territories.

7th. That the system proposed for the development of the highways of a new country by progressive stages corresponding with the progress made by the country itself in general advancement, is one peculiarly applicable to the case under discussion ; and while it might be expedient, in the first instance to employ some of the natural water channels as a means of introducing settlers and labourers along the line of road, until the latter became in some degree serviceable, it would not be advisable to incur any great expenditure on works beyond the limits of the great thoroughfare ultimately in view. That the first effort should be made to construct an Electric

Telegraph along the precise line of the future Railway, that the Telegraph should be the precursor of other means of communication, beginning it may be, with a Bridle Path or Indian Trail from post to post, and ending with a perfect line of Railway, when the traffic of the country, or the interests of the Nation required the most rapid means of steam communication.

With these remarks I will now attempt to show how the work, in its different stages, may be proceeded with.

The first step required is the location of what has been designated a "Territorial Road" between all the more important or governing points on the line of route. Commencing at the Western Terminus, these points would probably be, the mouth of the Fraser River, or the best harbour on the Pacific coast north of the 49th parallel—the best pass which has been or may be discovered across the Rocky Mountains contiguous to a line which would run along the general direction of "the Fertile Belt"** of the interior—the most southerly

"There is a broad strip of fertile country, rich in water, wood, and pasture, drained by the North Saskatchewan and some of its affluents; and being a continuation of the fertile prairies of Red River, the eastern watershed of the Assiniboine and Red Deer River, with the outlying patches called Touchwood Hills, File Hill, &c.

"It is a physical reality of the highest importance to the interests of British North America, that this continuous belt can be settled and cultivated from a few miles west of the Lake of the Woods, to the passes of the Rocky Mountains, and any line of communication, whether by waggon-road or railroad, passing through it will eventually enjoy the great advantage of being fed by an agricultural population from one extremity to the other.

"No other part of the American Continent possesses an approach even to this singularly favourable disposition of soil and climate; which last feature, notwithstanding its rigour during the winter season, confers, on account of its humidity, inestimable value on British America, south of the 54th parallel.

"The natural resources lying within the limits of the Fertile Belt, or on its eastern borders, are themselves of great value as local elements of future wealth and prosperity; but in view of a communication across the continent, they acquire paramount importance."—*Narrative of the Canadian Exploring Expeditions: H. Y. Hind.*

bend of the North Saskatchewan River—the best crossing of Red River between its confluence with the Assiniboine and the south-easterly end of Lake Winnipeg—the best crossing of the River Winnipeg near the north end of the Lake of the Woods,—the most northerly bend of the shore of Lake Superior—the best crossing of the French River between its junction with Lake Huron and Lake Nipissing,—and lastly, the most desirable point of connection with the existing Railway system of Canada either at Ottawa; at Peterborough, or at Barrie, all of which points are directly connected with the Grand Trunk Railway by means of the branch lines running southerly to it. On the location of the "Territorial Road," which could only be done on a careful survey of the country, the next step would be the determination of Station points from whence to lay out Colonization Roads to the right and left, wherever the soil was favourable for settlement. Upon the Colonization Roads the Townships would next be projected.

So soon as any section of the road was finally located, together with its branches, the introduction of settlers might commence. The road should be cleared through the wooded districts to a width of two chains or 150 feet, in order chiefly to preserve the Telegraph, when erected, from being injured by trees falling. The clearing would at once give employment to settlers, and with subsequent work in improving the road, greatly aid them in paying for their land and in supporting their families until their farms produced sufficient crops. Throughout the open prairie country, which is more than one third the whole distance, the trouble and expense of clearing would be avoided; but as the great natural obstacles which isolate the interior and prevent the possibility of establishing a continuous Telegraphic communication through the country are the wooded and broken districts at both extremities, it becomes indispensable to force a way of communication through them: this is doubtless a work of considerable

labour and corresponding expenditure; but without it no satisfactory progress can be made. This preliminary step is especially requisite to the east of the Red River valley, so that settlers might obtain access to the central plains, and in view of the construction of a continuous line of Telegraph at an early day, to be followed by a waggon road as soon as circumstances would allow, the Territorial line should be cleared through the western division likewise.

The "Territorial Road" from the settlements of Canada to the valley of the Red River would pass through a country only partially explored and consequently but little known; it must be said, however, that what is known of it is not very favourable. More careful surveys of a portion of the country, recently made by the Canadian Government have shown that a large section formerly considered worthless is really fitted for settlement and is now being rapidly occupied; and it is hoped from this circumstance that at least a portion of the land along those sections of the line yet unexplored is capable of being cultivated.

To begin at one end of the Road and gradually extend the settlements northward and westward would perhaps be too tedious an operation in view of the importance of opening an early connection with the interior. It would, therefore, doubtless be advisable to begin at several intermediate points accessible by water from Lakes Huron and Superior, and proceed with simultaneous operations. On referring to the map it appears that such points exist at distances ranging from 50 to 90 miles apart, and from these as bases the clearing of the road could proceed in both directions at the same time, while settlements could be formed wherever the soil proved favourable. In due time the clearings, penetrating the forest to the right and left along the line of Road previously located, would pierce the country from one end to the other, and the same being accomplished in a similar manner in the western division, a continuous line of Electric Telegraph might then be constructed.

The extreme importance of the Telegraphic communication extending from colony to colony across the country, even during the earliest stages of settlement, is too apparent to need comment, and being constructed on the precise line of the intended wagon road and of the ultimate Railway, it would always be in the position where its services would be called into requisition.

While the Territorial line through the eastern division gradually became developed into a good wagon road by the labours of the settlers and such grants of money as its importance appeared to warrant, it is probable that the Canoe Routes from Lake Superior to Red River might by partial improvement be made serviceable for ingress and egress during summer to the interior; and with the object of promoting emigration to the Central plains as well as to other points along the line of Road, it would probably be expedient to improve these routes by a limited outlay, but for the reasons already given I cannot help thinking that it would be the wisest policy to concentrate the chief expenditure on that line which must be sooner or later the leading highway through the country.

The expenditure of labour year by year on the Territorial line, as the country at the same time progressed in settlement, would gradually produce a regular stage road capable of being travelled with considerable rapidity; and which would serve all the purposes of transport from one point to another, until the increasing traffic was considered sufficient to maintain a line of steam communication. When that period arrived, comparatively little additional expenditure would be required to complete the line of railway, had proper care been exercised in locating the Territorial road in the first instance, and in constructing the work in its subsequent progressive stages. It is believed that probably not less than four-fifths of the whole length of the line might be ready for conversion into a railway, simply by laying the superstructure of cross-ties and rails on the surface of

the macadamised or gravelled road-bed; at other points permanent bridging and reduction of grades would be called for.

I would rather refrain from expressing an opinion as to the amount and mode of expenditure on a work conducted as above suggested, as so little is known of several important sections of the line of route, and so much depends on other considerations of detail. I may, however, by way of illustrating one of a variety of methods by which the general design of the scheme might be carried out, submit the following, premising, that while it is intended that the chief part, if not the whole of the cost, up to a certain stage, should ultimately come out of land sales, it would be necessary for either the Imperial or Colonial Governments to appropriate, in advance, sufficient to defray preliminary expenses; and perhaps it would be advisable that all expenses should be borne in this way up to the completion of a continuous line of Telegraph, to connect the chain of little colonies which would spring up along the line of route. All these expenses might be made a charge against the general Territorial Revenue of the country benefited, a revenue which would only begin to augment when the lands became easily accessible and were made productive by labour.

It has already been shown that the success of a railway to the Pacific would mainly depend on the possibility of introducing a sufficient number of inhabitants in the country to be traversed; if the population of the country is to govern the period when a railway should be set in operation, we may likewise take it as the basis of annual expenditure on the preliminary stages of the work. Suppose the average annual increase could be reckoned at 100,000 souls,*

* In the whole United States, which country resembles the one under discussion more closely than any other, there are about 1000 inhabitants to every mile of Railway in operation. It would scarcely be safe to estimate that a line through British America could be profitably sustained with a less

and that it be determined to expend annually on the works a sum equal to one dollar per head of the whole population in each respective year, the following results in the developement of the undertaking might be obtained:—

1st. In from three to four years, besides the expense of surveys, a territorial road line might be located, throughout, the wooded districts which extend over a length of over 1400 miles, might be cleared to a width of two chains, and a continuous line of telegraph constructed from Canada to Fraser's River.

2nd. Within a further period of two years a road passable for wheeled vehicles might be formed along the whole line of route.

3rd. Macadamized roads of the very best description might be completed, in addition to the foregoing, in the following order:—

(1) From Lake Superior to Red River, a distance of 400 miles, in nine years from the present time.

(2) From the mouth of Fraser's River to the Rocky Mountains, a distance of 400 miles, in eleven years from the present time.

(3) From the settlements of Canada to Lake Superior, a distance of 650 miles, within fourteen years from the present time.

(4) From Red River to the Rocky Mountains, a distance of 800 miles, within seventeen years from the present time.

And thus by the comparatively trifling annual outlay of one dollar per head of the assumed gradually increasing population, we

proportion of inhabitants per mile of its length. The whole length will probably be found to be between 2000 and 2500 miles, and hence the population ought to be from two to two and a half millions. It would thus require 20 to 25 years, even with an annual increase of 100,000 to give the requisite number.

* This would be a common earthen road on the natural surface of the ground, unless where grading and ditching is required; it would be similar to the colonization roads so economically opened by the Canadian Government through the wild country between Lake Huron and the Ottawa, as well as in other districts. Within the last four or five years a total length of nearly 800 miles has been opened, at a cost of about \$250,000.

ould secure in less than four years a line of telegraph, and in thirteen years more a substantially constructed macadamized road throughout the whole length of the line. The next and final stage of progress would be, the completion of the Railway on the line thus, in a great measure, prepared for it; and in view of the traffic then created, as well as the comparative economy in construction, it might be undertaken in sections by private enterprise, or in such other way as might then appear most expedient.

I am not prepared to say that the foregoing is the best order of sequence in which the several sections and stages of the work should be constructed, it is simply presented for the purpose of showing what might be accomplished by a small annual expenditure. It is not at all unlikely that the peculiar nature of the traffic might warrant the conversion of some section of route into a railway at an early period,—possibly that section between Lake Superior and Red River would be the first to require the change, which of course could be made without difficulty at any time, so soon as it appeared that the trade of the country was sufficient to maintain it. The order of sequence is not important, but it is an essential part of the system proposed for opening up this vast and roadless country, that very portion of work done should form a component part of a perfect whole, and that whatever expenditure is made, whether it be one thousand or one hundred thousand dollars, should be laid out in the right place in accordance with a thoroughly digested and well matured plan, the great object in view being to obtain the maximum result of good from the minimum amount of outlay.

I can scarcely hope to expect that the plan of gradual development herein advocated will satisfy the precipitate or the impatient,—those, in fact, who would urge the immediate construction of the road, regardless or ignorant of the cost and the burdens it might in consequence entail on the country—yet there are many who, remembering the tortoise in the fable, will perceive that a slow yet certain

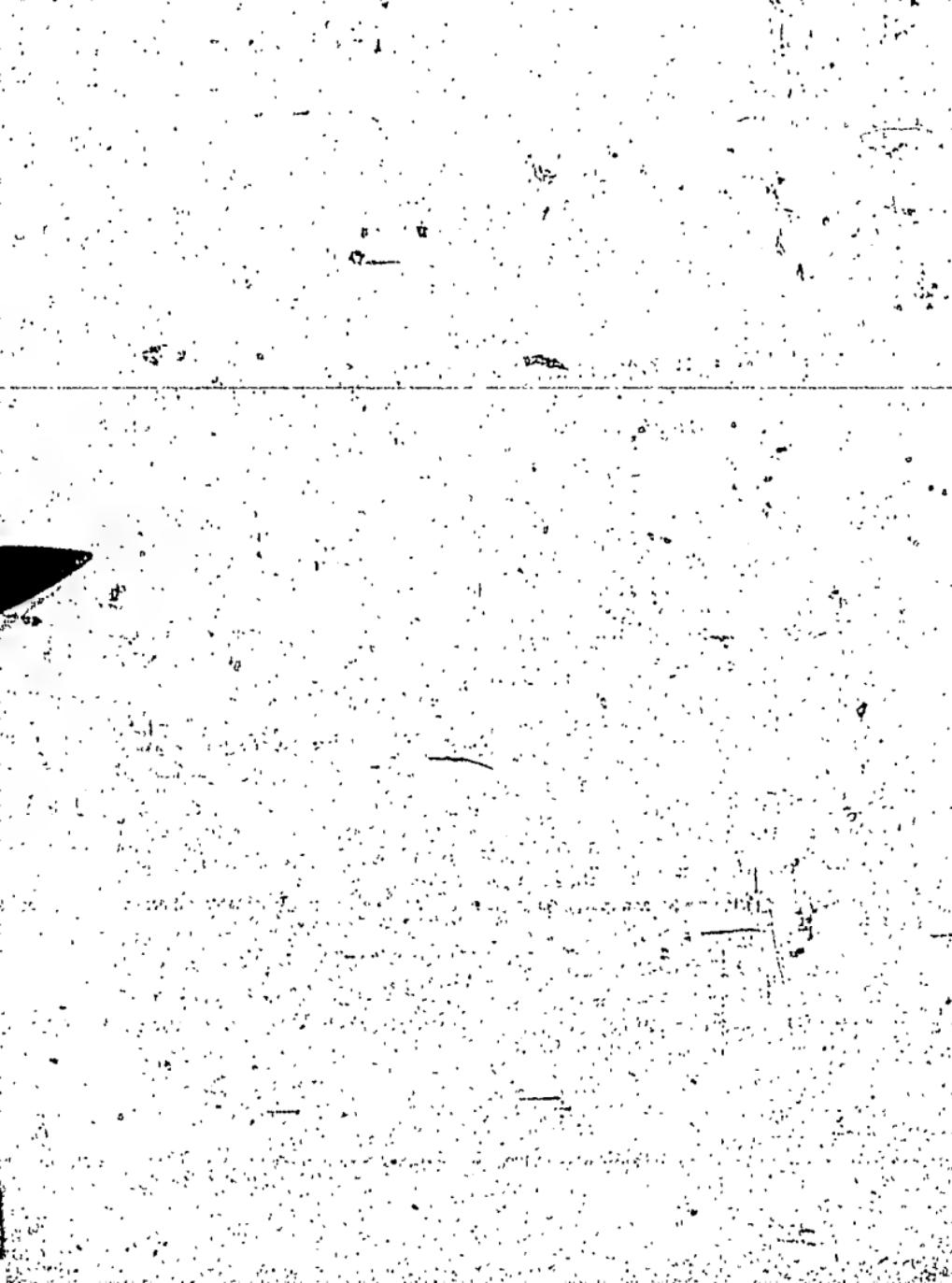
movement will accomplish the desired end with as much certainty and perhaps more satisfactorily than if the work was undertaken with the most sanguine hopes of speedy achievement. It is very doubtful, however, if any one will, on reflection, assert that there is really a choice of methods, that is to say, a fast and a slow one—the line of artificial highway proposed to be constructed extends over not less than forty-five degrees of longitude, equal to one eighth the length of a circle of latitude passing entirely around the globe; the undertaking, therefore, becomes one of no ordinary magnitude, and when in connection with it, half a continent has to be redeemed in part at least, from a state of wild nature, some considerable length of time must necessarily be occupied in the process. Even if it should take quarter of a century, it would be equal to an average construction of 100 miles of Railway a year, as well as the annual introduction of 100,000 emigrants. And, after all, a quarter of a century is but a very brief period in the history of a country—half that length of time has already elapsed since the Railways of Canada were first commenced, and yet many are of opinion that it would have been better, in some respects, had only one-half the extent of existing lines been yet constructed.

As the character of the work is so colossal and the condition of the country such as to debar the idea of undertaking the construction of a Railway through it in the usual way and as an ordinary commercial enterprise, I am emboldened to think that such a scheme as I have endeavoured to sketch, might form the basis of a system possessing many recommendations, and which it is confidently believed might be advantageously adopted in any attempt to establish a great leading highway through the vast unoccupied Territory between the settlements of Canada and British Columbia.

I am, dear Sir, very truly yours,

SANDFORD FLEMING.

TORONTO, April 14, 1862.



APPENDIX.

NO. I.

THE GOLD DIGGINGS OF BRITISH COLUMBIA.

(From the Times' Correspondent.)

VICTORIA, VANCOUVER'S ISLAND, Jan. 20, 1862.

In my last letter I gave a detailed account of the mining operations in British Columbia during the season of 1861. In this letter I propose to give a general sketch of the mineral region with the view of conveying to such as have not been in the country a definite conception of the extent and capabilities of the goldfield.

THE LOCALE OF THE GOLD DIGGINGS.

Beginning with Fraser River, the main artery of the auriferous region, I may state that gold is known to exist and has been worked at a great many places in the river and on its banks from a point about 48 miles from the mouth of the river up to near its source in the Rocky Mountains; in other words, from the 40th up to the 53rd parallel of north latitude, a distance (taking in the windings) of some 800 miles. The south branch of the Fraser has its source near Mount Brown in the Rocky Mountains, in about 56° north latitude, $148^{\circ} 40$ min. west longitude. Thence this branch flows for 290 miles to Fort George, a post of the Hudson's Bay Company. The north branch rises in an opposite direction. It receives its supply from a series of lakes lying between 54° and 55° of north latitude, longitude about $124^{\circ} 50$ min. west, and runs a course 280 miles to its junction with the south branch, some miles below the 54th parallel of north latitude. Here the union of the two branches forms the Fraser River proper. Adding the north branch, which is also a gold bearing

stream, and which was "worked" last season to the other arm, the two will give us a continuous stretch of auriferous riverain territory upwards of 1,009 miles in length, extending for many miles back into the country on both sides, but not including the tributary rivers which fall into the Fraser. In short, the river itself is now known to be auriferous and to pass through a gold-bearing country throughout its whole course. Gold is also found in most of the tributaries of the Fraser; of which no less than 59 are known. The great length of the main river and the number of its tributaries will give some idea of the auriferous resources of the country.

THE TERRACES OF THE FRASER.

But these facts do not by any means convey a comprehensive or accurate view of the vast extent of the area of the goldfield, because they are limited to the central portions of the country, while the whole of the upper portions of British Columbia, from its southern to its northern boundary, is auriferous. Besides the gold found in the beds and on the shores of these streams the Fraser itself and many of its tributaries are skirted or bordered by terraces, all of which yield gold also. These terraces or "benches," as the miners call them, run, at intervals, along both sides of the rivers for miles in length, and they recede where the mountains retire, for distances back into the valleys, varying from a few acres to a few miles in breadth. They are objects of curiosity and speculation, and add much to the beauty of the rude scenes in which they occur from the regularity and evenness of their structure. They generally occur on both sides of the river (opposite to each other), at the same place, sometimes at the same elevation on both sides, sometimes at different elevations, high on this, and low on the other side of the river; and in some places they are multiplied into several successive level parallel plateaux, rising one above the other as they recede from the bank. These terraces are composed of the ordinary alluvial deposits—loam, gravel, stones, sand and boulders; and they are thick masses rising generally to a height of a 150 to 200 feet.

Leaving the solution of their formation to the learned in such matters, I will hasten to explain their value to the miner. They contain vast de-

posits of gold; and to be worked to advantage the "bench diggings" must command a stream of water supplied from a source higher than their own surfaces, so as to give a fall to enable the miner to apply the water to the face of the "bench" by a hose. The force of the stream is due to the height of the fall. A good strong stream playing upon the face of the hill will disintegrate a great quantity of "pay dirt" in a short time. The floating rubbish, or "dirt," is caught in a long sluice at the base, provided with "rifles" on the bottom, and spread with quicksilver to catch the gold. This mode of mining is called by the miners "hydraulic mining." Such is the wealth of Cariboo that no quicksilver was used, for the miners could afford to lose all the "fine dust" and to be satisfied with the "lumps." It happens fortunately, that Fraser River and most of its tributaries supply water in abundance at an elevation which affords the necessary fall, from the elevated and broken character of the country; while there are inexhaustible supplies in the numerous lakes dispersed all over the upper district. Timber for the erection of "flumes" is also abundant everywhere. British Columbia is better supplied with water for mining purposes, obtainable both from streams at great elevations, and from lakes situated in high altitudes, than either California or Australia. Some of the "ditches" in California are of great length; some 40 miles, owing to the absence of streams running on elevated planes. The cost of construction is consequently very great. But Australia is much worse off, for there is an actual scarcity of water. The canal system of British Columbia will be comparatively inexpensive from the abundance of water and its eligibility, encouraging facts to the miner, because the small outlay of capital required will keep his "water dues" low.

To return to the "bench diggings." Whenever they have been "worked," they have paid well. They have been neglected for the greater attractions of the "placer diggings," where the gold is found nearer the surface and with less labour. But I consider this class of diggings of great prospective value. They will give employment to two interests—capital and labour. They are generally situated within easy reach of supplies. They are more accessible to all the influences of civilization

than more interior localities. They are in the neighbourhood of some good land, which will enable the labourer to alternate his time between mining and husbandry, and where he can make his *home*—the great want which the mines generally do not supply.

THE SOURCE OF THE GOLD.

Apropos to the subject of river mining, I would notice the remarkable fact that the streams which flow from the east are observed to be all auriferous, while those which run from the west are not so. Does this distinction prove that the source of all the gold spread over the goldfield is in the Rocky Mountains? The circumstance lends feasibility to this theory, and it is strengthened by the discovery of gold on the east side of the Rocky Mountains in rivers which take their rise in the same chain, but at the opposite side. You are aware that gold is worked on the Saskatchewan, the sources of which are not very far from those of the Fraser. We have also late information of the finding of gold on Peace River, which has its source also in the Rocky Mountains. We are informed that Peace River country contains silver and other ores—a specimen of one of which goes to the Exhibition.

FORT HOPE.

The reports of the mining this season on the Fraser in the space between Fort Hope and Fort George, a distance of about 270 miles, give the daily individual earnings at all sums between \$3 and \$15. Very little has as yet been done between these two points, and very little will be done so long as the attractions of \$100 to \$1,000 a-day continue elsewhere. I will now carry you to your mining localities. Leaving the Fraser at Fort Hope, 100 miles from its mouth, and following in the track of the miners to the southward and eastward for 60 miles, we come to the Similkameen. These mines yielded, last season, \$16 to \$17 a-day to the hand occasionally. A party of three men took \$240 in three days' work from "sluice diggings;" and the "rocker," used in "wet diggings," yielded \$4, \$5 and up to \$8 a-day to the hand. Number of miners 200, of whom 150 were Chinese. A waggon road for 25 miles from Hope, and a bridle road of 15 miles in continuation approaches this district.

OKANAGAN.

Sixty miles farther to the southward comes Okanagan. The average yield here was only \$4 a-day, and the miners were few—some 25 men—some of whom divided their time between mining and husbandry. Okanagan lake, a beautiful sheet of water, in a rich pastoral district, is from 80 to 100 miles long, and 8 to 10 miles wide, deep, and well suited to navigation. There is a small population in the valley, chiefly French Canadians, and a Catholic mission. There are two small lakes tributary to the great lake, and nineteen streams fall into the latter, of which seven yield gold.

ROCK CREEK.

In the same general direction, and distant from Fort Hope 150 miles, is Rock Creek, close to the American frontier (lat. 49° north), and 60 miles west of the Columbia River. The longitude of Rock Creek is 119° west. This place acquired a temporary reputation in 1860 for the richness of its mines, when a considerable population flocked to it and extemporized a town. In 1861 most of the miners were seduced away by the superior attractions of Cariboo, the latest and richest El Dorado yet discovered, so that only 30 white men and 225 Chinamen remained. A party of three white men saved in the season \$12,000 that I know of, after paying expenses; \$100 a-day to the hand was sometimes made. The average earnings are returned at \$7 a-day per man. There are both "bench" and "wet" diggings, and both are productive and extensive. The place is now abandoned.

LILLOOETT.

I fear I am getting tiresome, and must hasten to close this part of the subject by retracing my steps down the North River to Fort Kamloops. If we could pursue a straight western course from the Fort to Fraser River for about 100 miles we should strike the new town of Lillooett, situated at a point where the two great routes of travel into the interior meet that from Hope and Lytton by the river, and that by the Harrison Valley and Lillooett chain of lakes. Lillooett is the great final starting point to the northern mines, and beyond this there is no made road, and no other means of transport than horses, mules, and what the miners

expressively term "footing it." Lillooett is distant from the mouth of the Fraser (on the Gulf of Georgia), by the river route, *via* Hope, Yale, and Lytton, 220 miles; and by the Harrison route, *via* Harrison Lake, by steamer, Douglas, portages, and four lakes, crossed by steamers, 288 miles. The first route commands steamers up to Yale, the rest of the journey must be ridden or walked. The other route commands steamers to Douglas, a stage coach thence to Williams' Lake 29½ miles, on a road made along the Harrison river, chiefly by the Royal Engineers; an open boat on the first lake of five miles, steamers on the other three lakes, which are together 49 miles long, and the portages between the lakes and Lillooett, which in the aggregate of the four of them are 38½ miles long, can be ridden or walked. From Lillooett to the first or lower Cariboo mines the distance is about 260 miles.

BRIDGE RIVER.

A few miles beyond Lillooett, and on the same (the west) side, Bridge River falls into the Fraser. Bridge River is very rich in gold. The Indians of the neighbourhood make considerable earnings on it, working in the rudest manner with the most inefficient implements. It was here the Bishop of Columbia found them making an ounce a-day to the hand, as I mentioned in my last letter. Nodules of pure copper have been found in the bed of the river, indicating the existence of copper veins in the neighbouring banks.

I have already stated that the Fraser yielded \$8 to \$15 a day on the various points at which it has been worked, for a space of 270 miles. I shall therefore omit all further detail of the river from the point where Bridge River empties into the Fraser, about 20 miles below the 51st parallel of north latitude, up to the point where it receives the Quesnel River, a little below the 53rd parallel. This river has two branches, one of which drains Quesnel Lake, lying a degree and a-half to the eastward of the Fraser, and which is 50 miles long. The other branch drains Cariboo Lake, which receives Swamp River and Lower Cariboo Lake, into which Keithley's Creek, one of the Cariboo streams, empties. At the junction of the two branches, town, the nearest to Cariboo diggins, is built chiefly for the supply of the latter. The place is called "the

Forks of Quesnel." Both branches of the Quesnel are highly auriferous. Mining began here in 1859, and led to the discovery of Cariboo, situated 50 miles further north. The returns for last summer were that nine out of ten of the claims paid over an ounce a day to the hand. The river banks enable the miners to work in winter. The diggins must be rich to have retained any miners so close to Cariboo, where fortunes were made in the course of a few weeks.

THE LARGEST GOLD FIELD IN THE WORLD.

There is one grand prominent feature of the country pre-eminent from its extent and character, which I must not omit, for without a knowledge of it no accurate conception can be formed of the area or resources of the great gold field of British Columbia. I allude to a chain of mountains which runs from our southern frontier (on 49° north latitude) in a north-westerly direction through the country, and, in fact, beyond the northern limit of the colony. It forms the water-shed of the great basin of the Fraser River, one side of which drains itself into the valley of the Fraser, and the other into that of the Columbia. The whole of this vast range is now known to be auriferous. It has been traced for 400 miles, and "fine and coarse gold is everywhere found on its western slopes from Rock Creek in the south to Cariboo in the north." It is the longest stretch of continuous inland gold bearing country yet discovered in the world.

NO LOW EARNINGS.

In reading the returns of the daily labours of the miners, as well in my former letters as in this one, you will be surprised to find no mention made of *small* earnings: None are *low*, while all are *high*—which, without explanation would induce a doubt as to the accuracy of my reports. The omission looks, certainly as if the miners' "geese were all swans." The fact is, we never hear of the low earnings. They are never reported; and, on a broad view of the actual circumstances at present attaching to British Columbia mining, I may assert that there are no low earnings. Here is exactly how the matter stands:—Some of the Chinamen, while serving their novitiate, are satisfied with such poor diggins as yield only \$1 to \$2 a day, but they are soon forced by their task-masters, who

paid their expenses from China and San Francisco, and for whose benefit they labour, and who tax them both for the payment of these expenses and for a profit on the venture, to abandon such poor diggings for richer. And as to white miners, not one of them will work for the small earnings I have mentioned. If a miner cannot fall upon a rich "claim," he will hire himself to other more fortunate claim owners, who will pay him from \$5 to \$10 a day, according to location and circumstances. In this way it comes that no poor diggings are worked. The surface of the mineral region is being "skimmed"—not efficiently worked. In the foregoing sketch I have confined my observations to such portions of the country as have been *proved* to be auriferous. To give a perfect description of the gold field is out of the question. In fact, much of it is still undiscovered, and must continue unexplored in a country of such dimensions as British Columbia, extending over five degrees of latitude, and embracing a great portion of ten degrees of longitude, and which contains some 200,000 square miles of surface. Such an extent of country, and having such resources of gold, silver, and other metals, and a large quantity of agricultural and pastoral land, is an *empire*, and will require a large population *even to explore* it thoroughly. Suffice it to say, that as gold has been discovered at many points all over this vast surface, and in quantities hitherto unequalled, the gold field of British Columbia is practically, illimitable, and its wealth inexhaustible.

My advice to emigrants from the old country will be short, and, while it can easily be remembered, cannot be misunderstood. British Columbia wants two classes only—men with money, and men with bodily strength—*capitalists* and *labourers*. Both classes will do well. The one will find lucrative employment for its capital, the other still more profitable employment for its labour. If either fails, it will be its own fault. Should either of these two classes be married, let them bring their wives and families; the more numerous the progeny the better.

No. II.

RATES FOR 1862, *via* BURBANK'S EXPRESS, FROM ST. PAUL TO
FORT GARRY.

Ordinary merchandise, in lots of 2,000 lbs. and upwards, £1 stg. per 100 lbs.
Less than 2,000 lbs. 35 per 100 lbs.

We make the principal rate one pound, which will settle any difference about the value of pounds in Federal currency. Last year we rated the pound at \$4.80, but the drafts we received during the season only netted us an average of \$4.74—taking that basis we reduce our rates on large lots 26 cents, and on small \$1 per 100 lbs.

Passengers from Fort Garry to St. Paul, \$30. Fort Garry to St. Paul and return \$50. Our new boat, the *International*, will be down about the 15th of May, she will be in every respect equal to any boat of her size on the Mississippi. She will make regular fortnightly trips, will be two days running from Georgetown to Fort Garry—she will remain two days at Fort Garry—making the return trip to Georgetown in three days, and remaining there until next regular day for departure. She will run until the end of October, going through to Georgetown or Fort Abercombe every trip, and connecting with four horse post-coaches.

No. III.

LIST OF NECESSARY OR MERELY USEFUL ARTICLES IN A JOURNEY ACROSS THE PRAIRIES TO BRITISH COLUMBIA,
NOT ENUMERATED IN THE TEXT.

1. A pair of Mackinaw or North Blankets for each man.
2. An oil cloth or gutta percha cloth.
3. A set of tins (8) for cooking; a frying-pan, spoon, knife and fork, tin can and tin plate.

4. One large sized axe, and one small sized one.
5. A draw knife, a hand saw, an $\frac{1}{2}$ inch augur.
6. Cod lines, and rope for tethering, if necessary.
7. A supply of ball, powder, shot, tobacco, flint and steel, and tea, as presents for Indians.
8. A few yards of copper wire to mend cart wheels.
9. A small seine net (20 feet by 5 feet) for brook trout in the mountains—a gill net if wintering on the east side of the mountains.
10. A supply of vesper matches (they do not spoil with damp).
11. A piece of soft, tanned leather (6 feet by 2 inches) for hoppins.
12. A supply of pressed vegetables, if procurable.
13. A miner's pick, a spade, &c., &c., &c.
14. A couple of awls and a ball of stout twine—a supply of stout needles and strong thread.
15. A strong clasp knife, and a pound of wrought nails, assorted sizes, from 2 to 4 inches.

FINIS.

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